DOCUMENT RESUME

ED 032 417 VT 009 085

Program, Planning, Budgeting Systems for Educators. Volume I: An Instructional Outline. Leadership Series No. 18.

Ohio State Univ., Columbus. Center for Vocational and Technical Education.

Bureau No-BR-7-0158

Pub Date Aug 69

Grant-OEG-3-7-000158-2037

Note-279p.

Available from-The Center for Vocational and Technical Education, The Ohio State University, 1900 Kenny Road, Columbus, Ohio 43210 ($4.00)

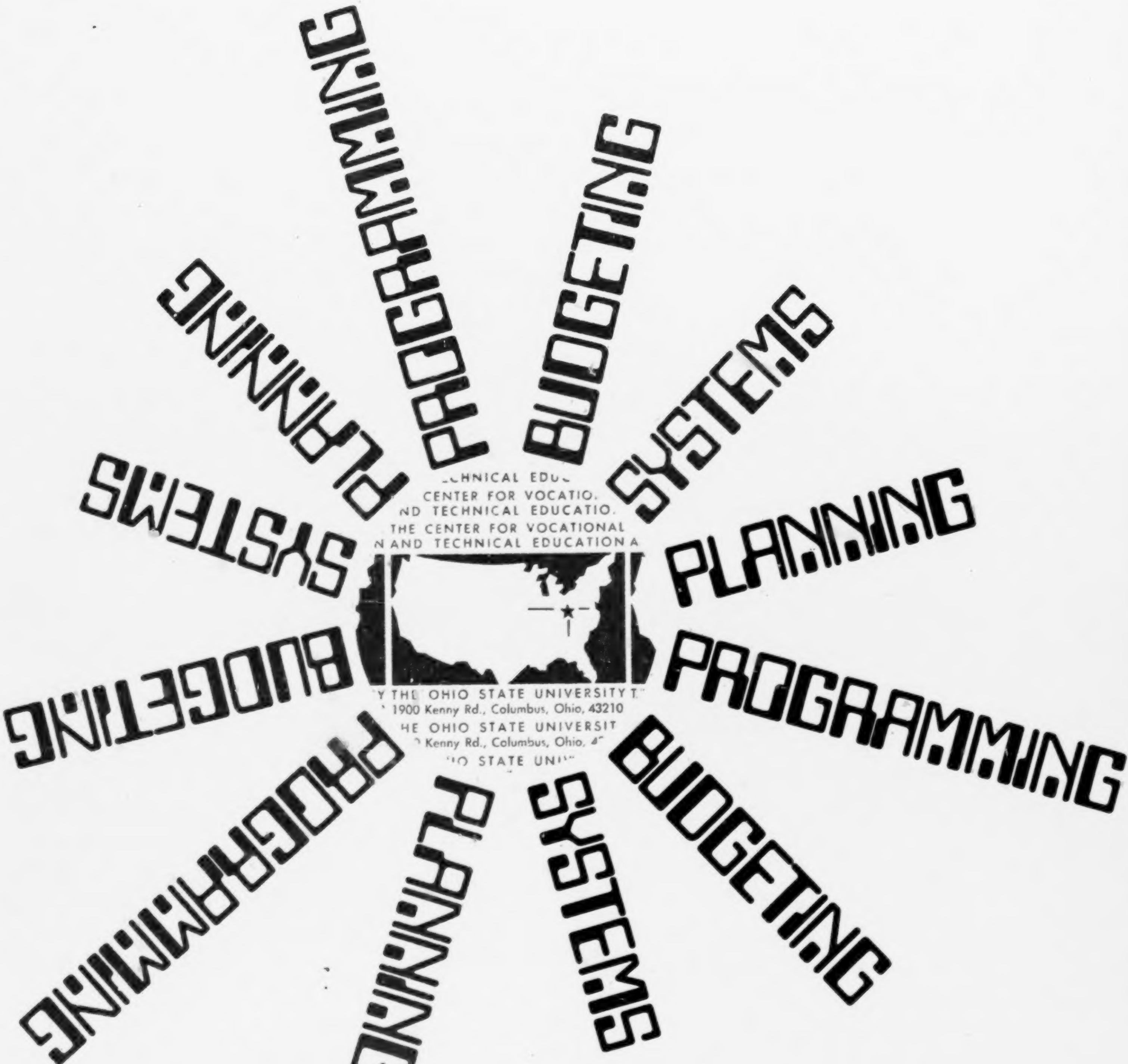
EDRS Price MF-$1.25 HC-$14.05

Descriptors-*Cost Effectiveness, *Curriculum Guides, Educational Economics, Illustrations, Models, Program Budgeting, Program Costs, *Program Planning, Resource Allocations, Statistical Analysis, Supplementary Textbooks, *Systems Approach, Teaching Guides, Transparencies, *Vocational Education

Identifiers-*Planning Programming Budgeting System, PPBS

Planning, Programming, Budgeting System (PPBS) includes concepts and techniques for resource allocation decision making for rational and effective programming. Most federal agencies use PPBS for the development, analysis and presentation of resource needs. Traditional methods of budgeting focus primarily on resource inputs; PPBS focuses on both inputs (cost) and outputs (benefits). The guidelines in this volume suggest initial training in a sequential pattern for a course in PPBS. Examples used are drawn from the field of vocational education. Included in the instructional outline are sections relating to: (1) Overview, (2) Systems Theory, (3) The Planning Process, (4) Investment Alternatives, (5) Program Budgeting, (6) Analysis of Alternatives, (7) Programming and Management Control, (8) Basic Data for PPBS, and (9) Limitations of PPBS. The document contains three parts: The What-When-Where-Who-Why of This Educational Program, An Educational Training Program in PPBS, and Supplement to the Basic Educational Program. The supplements include pre- and post-tests, a conceptual framework, the relationship of education and economics, and methods of statistical analysis in PPBS. A case problem is announced as VT 009 089. (DM)

ED032417


PLANNING
PROGRAMMING
BUDGETING
SYSTEMS
PLANNING
PROGRAMMING
BUDGETING
SYSTEMS
PLANNING
PROGRAMMING
BUDGETING
SYSTEMS
THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION
THE OHIO STATE UNIVERSITY
1900 Kenny Rd., Columbus, Ohio, 43210

FOR EDUCATORS
VOLUME 1
AN INSTRUCTIONAL OUTLINE

VT009085

The Center for Vocational and Technical Education has been established as an independent unit on The Ohio State University campus with a grant from the Division of Comprehensive and Vocational Education Research, U. S. Office of Education. It serves a catalytic role in establishing consortia to focus on relevant problems in vocational and technical education. The Center is comprehensive in its commitment and responsibility, multidisciplinary in its approach, and interinstitutional in its program.

The major objectives of The Center follow:

1. To provide continuing reappraisal of the role and function of vocational and technical education in our democratic society;
2. To stimulate and strengthen state, regional, and national programs of applied research and development directed toward the solution of pressing problems in vocational and technical education;
3. To encourage the development of research to improve vocational and technical education in institutions of higher education and other appropriate settings;
4. To conduct research studies directed toward the development of new knowledge and new applications of existing knowledge in vocational and technical education;
5. To upgrade vocational education leadership (state supervisors, teacher educators, research specialists, and others) through an advanced study and inservice education program;
6. To provide a national information retrieval, storage, and dissemination system for vocational and technical education linked with the Educational Resources Information Center located in the U. S. Office of Education.

LEADERSHIP SERIES NO. 18

FINAL REPORT
ON A PROJECT CONDUCTED UNDER
PROJECT NO. 7-0158
GRANT NO. OEG-3-7-000158-2037

PROGRAM, PLANNING, BUDGETING SYSTEMS FOR EDUCATORS. VOLUME I: AN INSTRUCTIONAL OUTLINE

JOSEPH H. McGIVNEY

WILLIAM C. NELSON

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION
THE OHIO STATE UNIVERSITY
1900 KENNY ROAD COLUMBUS, OHIO 43210

AUGUST 1969

This publication was prepared pursuant to a grant with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official Office of Education position or policy.

U. S. DEPARTMENT OF
HEALTH, EDUCATION & WELFARE

Office of Education
Bureau of Research

PREFACE

One of the major commitments of The Center for Research and Leadership Development in Vocational and Technical Education is state leadership development and training. In 1967, The Center sponsored a national conference on the *Emerging Role of State Departments of Education with Specific Implications for State Divisions of Vocational Education*. One of several important outgrowths of this conference was the recognition of a greater need for rational systems for planning, programming and budgeting state educational needs.

The Vocational Education Amendments of 1968 further reinforce this concept and require states to submit state educational plans for the current year and projected for the succeeding four years. Such requirements necessitate long-range planning, development and program evaluation by the states. In recent years, considerable emphasis has been placed on economic models for planning a variety of programs, including education. Program planning and budgeting systems have received new eminence and are being implemented in a variety of settings. It appears that the concepts underlying PPBS will exert an even greater influence in decisions concerning vocational and technical education in the future.

In October of 1968, The Center sponsored a two-week institute on program planning and budgeting systems for state level personnel in vocational and technical education. Four volumes of leadership training materials on the applications of program planning and budgeting systems to vocational and technical education systems were prepared. These were tested in the institute and have been further refined. Volume I constitutes the basis for a training program in PPBS. It outlines the parameters of PPBS and, more importantly, explores the interrelationships of the concepts and methodologies undergirding the system. Supplementing this basic volume are two additional volumes which complete the total training package. Volume II presents a simulated case problem to which the concepts of PPBS delineated in Volume I can be applied. Volume III contains annotated bibliographies of literature relevant to PPBS, and Volume IV is a research bibliography.

We trust that this instructional materials package will be of use in leadership development programs in the various states. We invite suggestions and comments directed toward their improvement and further refinement. The Center is grateful to the many individuals and groups who contributed to the content and review of these materials. Special recognition is due Joseph H. McGivney, formerly specialist at The Center and now a member of the faculty at Syracuse University, and William C. Nelson, research associate at The Center, for their work, development and authorship of this training package.

Robert E. Taylor
Director
The Center for Vocational
and Technical Education

INTRODUCTION

This educational program is designed to serve as a guide to theorists and practitioners, teachers and students, decision makers and their advisors in the study of the conceptual, methodological, and operational aspects of Planning, Programming, Budgeting Systems (PPBS). Accordingly, members of state and local boards, present and prospective state and local administrators, teachers and others influencing the educational system can benefit from this training program.

To serve the needs of persons with such diverse training requirements, the authors tried to construct a training program to accommodate vast differences in available time, varying clientele groups, and different learning-environments. Thus, the user of this educational program may cover PPBS for executive orientation in a three-day institute or may design a training component for those who are or will be directly engaged in the development and implementation of a program budgeting system which requires more time and detailed consideration of PPB. Moreover, many of the conceptual configurations associated with PPBS are useful for management training on their own; they need not be used within a PPBS teaching module. For example, benefit/cost analysis is a useful analytical tool with or without PPB.

It must be noted here that the training program presented herein is developmental; the final refinements of PPB have not yet been consumated. Thus, the reader and/or instructor is not being given a final set of answers; he is being presented with a set of training materials which will guide his efforts in understanding and transmitting the conceptual and operational skills and knowledge of PPBS to his students. The teacher, in using these materials, will be participating in the further development and refinement of PPBS. The significant applications of PPBS have been and will continue to be influenced by practitioners. Hence, the authors strongly recommend that training based on these materials be supplemented and complemented with simulated or actual experience.

The writers are greatly indebted to many persons. Thanks are owed to those who made critical comments, general and specific suggestions on the scope, content, packaging, and suitability of the training program. In this category are included Professors Donald Anderson and Samuel C. Kelley, and Research Associate John R. Shea of Ohio State University; Deputy Assistant Secretary of Defense (Comptroller) George Berquist and Laurence Olewine, director, Financial Management Education and Information, Department of Defense; of his staff; Professors Jesse Burkhead and George Fredrickson of Syracuse University; Paul Brown, budget director, Wisconsin State Budget Bureau; Thomas Czerwinski, deputy director, District 13 Vocational Technical School, Green Bay, Wisconsin; Jack Culbertson, director, University Council on Educational Administration, The Ohio State University; Professors Jacob J. Kaufman and Irwin Feller of Pennsylvania State University; Harry P. Hatry, deputy director, The

State-Local Finances Project of George Washington University; Vincent Moore and Robert Daggett, Office of Planning Coordination, Executive Department, State of New York; Joseph Wholey, Urban Institute, Washington, D. C.; Chester Wright, director, The Financial Management and PPBS Training Center, Bureau of Training, United States Civil Service Commission; Sylvia Lee, A. J. Miller, J. R. Warmbrod, Neal Vivian, and Sally Markworth at The Center for Vocational and Technical Education, The Ohio State University; and finally to Daniel L. Merritt of Syracuse University. Their assistance was enormously helpful. Any remaining shortcomings, of course, rest with the authors.

The authors are also grateful for the kind permission extended by certain publishing firms to adapt from and reproduce selected charts, graphs, and narrative materials. Included in this category are The Harvard Graduate School of Business Administration; Frederick Praeger, Inc.; Prentice-Hall; and The State of New York, Executive Department. The relevant adaptations and/or reproductions are cited in the following pages.

Finally, the participants in the National Distributive Education Conference on Planning at Utah State University (1968) and the faculty and participants of the National Development Institute on Planning, Programming, Budgeting Systems at the Ohio State University (1968) are deserving of special praise for their cooperation and assistance in the further refinement of this training program.

Joseph H. McGivney

William C. Nelson

TABLE OF CONTENTS

iii Preface
v Foreword

PART I

THE WHAT-WHEN-WHERE-WHO-WHY OF THIS EDUCATIONAL PROGRAM

5 Introduction
8 Description of the Program
10 Organization of the Program
11 Alternative Methods of Presentation
12 Structuring Program Sections
13 Design and Field Testing
14 Final Note

PART II

AN EDUCATIONAL TRAINING PROGRAM IN PPBS

17 Section 1--Overview of PPBS
37 Section 2--Systems Theory
55 Section 3--The Planning Process
69 Section 4--Investment Alternatives
81 Section 5--Program Budgeting
99 Section 6--Analysis of Alternatives
131 Section 7--Programming and Management Control
159 Section 8--Basic Data for PPBS
173 Section 9--Limitations of PPBS

PART III

SUPPLEMENTS TO THE BASIC EDUCATIONAL PROGRAM

185 Section 10--Conceptual Framework for Planning and Control Systems
211 Section 11--Education and the Economic System
255 Section 12--Statistical Analysis in PPBS

PART IV

EVALUATING THE TRAINING EFFORTS: PRETEST AND POSTTEST SUGGESTED INSTRUMENTS

271 Section 13--Cognitive PPBS Objective Test
275 Section 14--Cognitive PPBS Subjective Pretest
277 Cognitive PPBS Subjection Posttest
281 Section 15--Frequency of Interaction Pretest
282 Frequency of Interaction Posttest

PROGRAM, PLANNING, BUDGETING SYSTEMS FOR EDUCATORS. VOLUME I: AN INSTRUCTIONAL OUTLINE

SECTIONS

1
2
3
4
5
6
1
1
1
1

PART 1

THE WHAT-WHEN-WHERE-WHO-WHY OF THIS EDUCATIONAL PROGRAM

INTRODUCTION

President Lyndon B. Johnson's 1967 budget message to Congress included a special section entitled "Planning, Programming, Budgeting System" (PPBS) which required that virtually every federal agency use PPBS for the development, analysis, and presentation of its resource needs to the President. It is quickly becoming the process through which resource allocation decisions at the federal, state, and local levels will be made.

PPBS staffs have multiplied rapidly at all levels of the executive branch during the last two years. For example, within the Department of Health, Education and Welfare, the Secretary, the Commissioner of Education, the Associate Commissioner for the Bureau of Adult, Vocational and Library Services, and the Assistant Commissioner for Vocational and Technical Education have established PPBS staffs.

The effects of this approach to decision making have only recently begun to be extended into the public schools of the nation; thus, educators at all levels (teachers, administrators, and board members) must understand the system together with its implications for policy and practice.

What is PPBS? Planning, Programming, Budgeting System (PPBS) is a system of concepts and techniques for decision making which makes resource allocation decisions more rational and programming more effective.

Traditional methods of budgeting focus primarily on resource inputs. PPBS goes one step further in order to measure the effects and results of the process; it focuses on both inputs (costs) and outputs (benefits). PPBS is not revolutionary--its ingredients are new only in their arrangement and use. Concepts and methodologies relating to PPBS are: program budgeting, benefit/cost, cost effectiveness, cost/utility, operations research, systems analysis, etc. The mix of sub-concepts applied to any one department would depend upon 1) the public policy arena involved (i.e., education, defense, water resources), 2) the public policy jurisdiction involved (federal, state, local), and 3) the knowledge and skill of personnel employed by the department.

Although the particular combination of sub-concepts and methodologies may vary, the distinctive characteristics of PPBS are that it:

1. Assures a choice of valid alternatives.

2. Relates all activities to their objectives in quantifiable terms.

3. Builds in a time dimension that sees today's decisions in terms of their longer term consequences.

4. Considers all pertinent costs and benefits (actual and/or estimated).

5. Helps to institutionalize change by providing continuing analysis of goals, objectives, and programs.

The major contribution of PPBS over traditional budgeting systems lies in its potential for *integrating* planning, programming, and budgeting processes. Planning in this context refers to the process of identifying alternative long-term objectives. Programming optimizes the mix of resources to achieve specific multi-year plans consistent with the long-term objectives established in the planning process. Budgeting is the detailed short-term (one to five years) resource plan for implementing the specific multi-year program plan selected in the programming process. System, then, refers to the inter-relationships among planning, programming, and budgeting; PPBS conceptual and operational integration; feedback and updating of objectives and programs.

Recent Adoption. PPBS is a natural outgrowth from both private and public experience in planning and management. In 1954 David Novick of the Rand Corporation proposed a "new" budgeting concept to integrate the planning, programming, budgeting, and accounting activities of the Department of Defense. The idea lay dormant until Robert McNamara became Secretary of Defense in 1961. Under McNamara's leadership, Defense Department Comptroller Hitch installed a PPBS system which gained increasing favor with policy makers at the federal level.

By 1965, the Johnson administration recognized McNamara's success with PPBS and the Bureau of the Budget's Bulletin 66-3 required that all federal agencies use the Planning, Programming, Budgeting System in the preparation and submission of their budget requests to the President. In 1966, the Committee for Economic Development urged Congress to adopt the new system. Strong endorsement was given by the President in 1967.

On the state and local levels, initiatives toward more rational approaches to resource allocation also emerged. Wisconsin adopted a program budgeting system in 1963. In New York, Governor Rockefeller's administration installed a PPBS system.

In 1966 the Ford Foundation granted funds to the State-Local Finances Project at George Washington University for the study and implementation of PPBS in five states, five counties, and five cities. The Five-Five-Five project was sponsored jointly by the Council of State Governments, the International City Managers Association, the National Association of Counties, the National League of Cities, and the United States Council of Mayors. The five states selected were: Wisconsin, New York, California, Michigan, and Vermont. The counties are DADE (Miami), Florida; WAYNE (Detroit), Michigan; DAVIDSON (Nashville), Tennessee; LOS ANGELES, California; and NASSAU, New York. The cities include Dayton, Ohio; Denver, Colorado; Detroit, Michigan; New Haven, Connecticut; and San Diego, California.

Education is also phasing in PPBS systems. Harry J. Hartley's recent book, *Educational Planning Programming Budgeting: A Systems Approach*, summarizes developments in education and provides much descriptive material in which he identifies 10 representative school districts which are implementing PPBS. They are Baltimore, Chicago, Dade County, Los Angeles, Memphis, New York, Philadelphia, Sacramento, Seattle, and Westchester County in New York State.

Jessie M. Unruh, former Speaker of the California Assembly, in a recent *Newsletter*, summed up the need for a PPBS system at all levels:

> In my judgment, well informed legislators, governors, and administrators will no longer be content to know, in mere dollar terms what constitutes the abstract needs of the schools. California educators have used this tactic with our legislature for many years with constantly diminishing success. The politician of today, at least in my state, is unimpressed with continuing requests for more input without some concurrent idea of the school's output.

The implications are important. The federal government and an increasing number of state and local governments (including education) are installing new frameworks through which requests for public resources will be filtered. Since subsystems must adjust their structure and processes to the framework of the larger system, as governors and/or legislatures (larger systems) install PPBS structures and decision making processes local governments and education (subsystems) will be obliged to participate within that framework.

The utility of these materials. Against this background, it becomes more clear why PPBS literature was virtually extinct until 1965. *Program Budgeting*, edited by David Novick, was published in 1965 and represented a first attempt to systematically describe and explain some of the notions surrounding PPBS, some of the practices in widely varying programmatic areas, and some of the claims for and against PPBS. Since 1966, the staff of the State-Local Finances Project has published *Program Planning for State-County-City* and several supplements to it. Moreover, the general production of PPBS literature has begun to mushroom.

The rapid increase in the literature of PPBS and related concepts poses a major problem to the person wishing to conduct training programs and/or learn more about the theory and practice of PPBS. What materials should be studied and/or ignored? In what sequence should they be studied? What persons should have what material? When and how often should they have such training?

This volume, together with the coordinated Volumes II *(Planning, Programming, Budgeting Systems for Educators: A Case Problem)* and Volume III *(Planning, Programming, Budgeting Systems for Educators: An Annotated Bibliography)* represent a significant step toward answering these questions. The guidelines suggest initial training in a sequential pattern which also meets the needs of the advanced student and practitioner because of its flexible design.

The materials contained in these volumes permit the fullest flexibility, innovation, and adjustment on the part of teachers, instructors, institute managers, etc. While the time-tested concepts and techniques of PPBS are included in these materials, their inclusion in no way inhibits their application to any situation or problem desired by the user. Moreover, the breadth of topics covered represents a most contemporary summary of the state of the art of PPBS. Early advocates of PPBS excluded some of the behavioral and organizational factors impinging on the successful implementation of decisions. Thus, the potential user must concern himself with the implementation of decisions and related problems as well as with the development and enactment of "good" public policy. As further refinements occur they can be added to this training program.

Although the examples used are drawn from vocational education, there is no reason why examples from social welfare, transportation, water resources, or other fields could not be substituted and used in concert with the general conceptual and methodological sections of these materials.

The integration of the lecture-discussion materials in Volume I, with the case and problem type material in Volume II, and the annotated bibliography in Volume III permits the user to choose among a wide range of teaching styles and situations which can be varied with teacher, clientele, time, and subject matter. These materials permit and encourage the use of existing textbooks, research reports, and articles as supplementary and complementary to the "classroom" exchanges.

DESCRIPTION OF THE PROGRAM

The material included represents a learning component concerned with the process of teaching PPBS and related concepts.

Taken as a whole, the material presents a logical and sequential framework within the instructor and learner may progress at their own rates. The basic content also contains provisions for individualized development to meet the needs of the student.

There are two very important dimensions for progression on the part of the learner: horizontal progression, which is defined as the extent of material covered or achievement of broad, but minimal, objectives and vertical progression, which is defined as the depth to which a learner explores a particular concept or the degree to which he surpasses the minimal performance objectives in a concept area.

Overview of the content. The basic program for teaching Planning, Programming, and Budgeting Systems is divided into nine sections and is included as Part II of this volume. Part III which includes three additional sections contains supplementary materials that permit the student and instructor to pursue an even more extensive program in PPBS and its related concepts. Part IV contains a number of evaluation devices which can assist the user in the measurement of the readiness and success of students participating in the training program. Only the materials of Part II have undergone field testing; however, the authors believe that all 12 sections are relevant and useful in the study of PPBS.

Section 1 presents an overview of PPBS and includes a brief description of PPBS, its historical anticedents, its critical concepts, and the limitations on its utility.

Section 2 concentrates on systems theory. The general notion of natural and man-made systems is included in the first part of the section. The second part introduces more specific relationships such as those between models and systems.

Section 3 explores the planning process used in PPBS. The purpose of the planning process, the importance of identifying influencing factors, ascertaining needs, defining roles for the public and private sectors, and organizing for planning are presented in this section.

Section 4 builds upon information gained in previous sections and explores objectives, costs, alternatives, and benefits in examining and discussing investment alternatives. The processes used to identify the benefits and costs of a proposed program are analyzed within a conceptual framework that constantly relates the specific elements of a program to influencing factors in the environment.

Section 5 is concerned with the elements of program budgeting. The learner is exposed to terminology that is peculiar to program budgeting. Methods of constructing program budgets and supportive systems necessary to the successful use of the program budget are identified and analyzed.

Section 6 analyzes the problems of measuring educational benefits and costs. Various investment criteria are presented and compared for their validity under differing situations.

Section 7 presents programming and management control and the integration of planning, programming, budgeting with the accounting and other management systems. The three basic functions of the budget for control, performance, and planning are developed.

Section 8 considers the basic requirements of a student and staff accounting system. Registration information is related to teacher, student, management, and research needs.

Section 9 systematically explores the limitations of PPBS. It examines the impact upon an organization when the PPBS program is adopted and various strategies for dealing with the system and the results of the system are explored.

The basic program is sequential. The concepts presented in Section 1 should precede the work in Section 2, and so on for the entire program. The sequential program is also interlocking, so that new knowledge and skills presented in a section will be accompanied by some of the concepts introduced in earlier sections. This approach is well suited for a basic program but consideration should also be given to those who wish to surpass the performance levels set for the basic program.

Part III provides this function by presenting materials which complement the basic program of Part II. The different purposes of planning and control systems are viewed at the micro and the macro level in Section 10. Useful distinctions among strategic planning, management control, and operational control are made and are interrelated in a general conceptual framework.

Section 11 deals in depth with economic analysis of an educational organization. The difficulties associated with measuring the inputs and outputs of the educational enterprize are identified and explained.

Section 12 is concerned with the utilization of statistical analysis in PPBS. This part of the program not only describes the differences in descriptive and inferential statistics but also ties the use of each to various purposes of PPBS.

Part IV contains test materials which should be useful to the instructor (and student) in determining the readiness of students for PPBS, their degree of added achievement based on the training program, and where appropriate, the degree of interaction among the students before and after the training program. The interaction instrument is particularly useful when the training program includes small group work on case problems as part of the training program; from the tabulated scores one should be able to infer "leadership" personnel who could be contacted and asked to participate in future training programs.

Section 13 consists of an objective test to measure the degree of cognative learning. This test can be used to identify areas which need the greatest emphasis in the training activities and to measure the degree of knowledge gained by the participants.

Section 14 consists of both a subjective pretest and subjective posttest. These tests permit the instructor to verify the student's achievement level on the objective test with a more subjective measure of achievement level. Moreover, as a pretest, the subjective portion should provide the instructor with valuable information regarding the level of practical involvement of the student; such information should be useful in determining the curricular mix to be offered.

Section 15 contains the interaction instruments discussed above. As is, it can assist the instructor in defining the social system and and subsystems composing the group receiving training. Moreover, it can be modified to provide more refined interaction data.

Although each section is placed in a particular sequence which represents a basic program for teaching PPBS, deviation from the basic program is possible and encouraged. The independent nature of the concepts dealt within certain sections have been noted whenever appropriate. The instructor is therefore provided with alternative methods of ordering the sequence or utilizing a particular section of the program in other areas of study.

ORGANIZATION OF THE PROGRAM

The *prerequisites* have been established for each section of Parts II and III of the program. The prerequisites were set in relation to desired outcomes and are minimum standards that should be met by the learners before beginning each section.

Evaluation devices which are related to the prerequisites outlined in each section have been provided to assist the instructor in the development of effective teaching plans and to promote a more effective learning experience for the participants. *Time estimates* have been suggested for each section. Although these are not absolute, they provide the instructor with an approximation of the time involved.

The *objectives* included in this program are minimal performance standards to be achieved by the learner. The objectives represent an orientation to the section under study and the instructor and the learners should review this section carefully at the beginning of the teaching-learning sequence.

The *desired outcomes* in each section are stated in behavioral terms so that the attainment of objectives may be measured and evaluated by the learner and the instructor. Since they are closely related to the learning activities of the students, specific instructional activities have been suggested in each section.

Each section includes *general references* which may be used to provide the background information necessary to support the instructional program.

The references have relevance for those students wishing to pursue studies beyond the instructional program and for the instructor who may wish to gain even greater depth of knowledge in a specific concept. Moreover, the references may be used to reduce deficiencies in student performance which result from a lack of particular knowledge or skill.

Finally, each section contains a reference to Volume III of this series which contains an annotated bibliography divided in the same manner as this volume.

ALTERNATIVE METHODS OF PRESENTATION

The main assets of this program are the multiple modes of presentation available to the instructor. Whether used as a basic, a restructured, or a partial program, the instructor may choose from a variety of the materials included in this program or supplement this program with materials of his own. There are four basic modes of presentation that may be developed from the program materials. The materials may be used as presently constructed; they may be converted to transparancies in whole or in part; certain parts may be used as study guides and reproduced from the basic document; or combinations of the above may be produced for varying group situations. The type of learning activity to be utilized should be selected on the basis of such variables as group size and characteristics, time availability, and the style of the individual sections (paragraph or outline). This flexibility in the program material supports its use by individuals with varying abilities. All of the sections may be restructured into a variety of new patterns to meet the needs of the group to be taught or, in some cases, the needs of an individual student.

The program materials also support the omission of specific portions to meet the needs of the group. Deletion of material before presentation may aid the smooth transition from concept to concept which is often lacking when portions of a basic textbook are selected or when a variety of texts are used without some general referent structure.

The material in Parts II and III also provide a point of departure for the more ambitious learner. The reference material in each section suggests a variety of possible study areas upon which a student may concentrate according to the needs and interests of the individual student and instructor.

Case studies and other simulated experiential material are referenced to provide the learner with the opportunity to apply the knowledge he has gained from more conventional academic sources.

Time estimates, based on field testing experience, for completion of each section have been provided as an aid to the instructor. These estimates should be used as guides for the instructor of the program in the event that it is necessary to restructure all or part of the program material. Prerequisite knowledge and skills have been listed in each section to provide the instructor with another aid toward determining the suitability of the material for the learners and to allow the individualization of instruction.

The program material may be adapted to different groups of people, learning environments, and time periods and makes use of situational contexts only to the extent necessary to make a point. Instructors wishing to use these materials in other situations can do so by merely citing different examples. The material included in the annotated bibliography (Volume III) and the casebook (Volume II) provide a variety of additional experiences which can be screened for use by any particular group.

STRUCTURING PROGRAM SECTIONS

Graphically, the basic PPBS program (Part II) might be viewed in the following way:

BASIC PROGRAM

Program Sections	1	2	3	4	5	6	7	8	9	10	11	12
Estimated Time (hours)	3	3	2	3	2	6	4	2	3	3	5	4
Recommended Time For Case Problem Work (hours)	3	3	4	3	4	6	4	4	3	3	10	6

Each program section being a self-contained unit may be treated as such but when it is combined with other sections it forms a more complete segment. Restructuring the program may take any number of new forms. For example, an instructor who is interested in the planning process only may use only Section 3 for his program.

PLANNING

Program Sections	3
Estimated Time (hours)	3
Recommended Time For Case Problem Work (hours)	3

Another instructor may wish to go beyond the planning phase and concern himself with the decision making process that must occur before and after input-output analysis. He may wish to have the following program configuration.

PLANNING AND DECISION MAKING

Program Sections	3	4	6	9
Estimated Time (hours)	2	4	8	3
Recommended Time For Case Problem Work (hours) (hours)	4	4	8	O.S.T.

A manager may wish to acquaint his lower echelon administrators with systems theory and his program would assume the following form.

SYSTEMS THEORY

Program Section	1	2
Estimated Time (hours)	3	3
Recommended Time For Case Problem Work (hours)	3	3

Finally, a chief administrator may wish to have his business management personnel learn about planning and control systems without becoming involved with PPBS. His program may involve a shift in sequence of the sections. His program may be represented as follows:

PLANNING AND CONTROL SYSTEMS

Program Section	2	10	7
Estimated Time (hours)	3	3	4
Recommended Time For Case Problem Work (hours)	3	3	4

It is important to remember that the section numbers displayed in the previous tables represent working documents for the instructor. These documents have been previously described as a process guide. The basic program is constructed so that the flexibility in the method of presentation, the mode of presentation, the arrangement of the structure, and the supportive material provide a strong foundation; and, yet, encourage alternative arrangements to suit the needs of the individual learner.

DESIGN AND FIELD TESTING

Although certain factors of the PPB System have received attention for some time, it was not until early 1967 that leading administrators, educators, and researchers recommended the development of a more comprehensive training effort in PPBS and its related concepts at the National Conference on the Emerging Role of the State Department of Education sponsored by The Center for Vocational and Technical Education in Columbus, Ohio A project to develop, test, refine, publish, and disseminate training materials was initiated in June 1967.

A thorough review of PPBS and related literature was undertaken and an extensive bibliography compiled. The project staff conferred with academic and operating experts in PPBS and visited federal, state, and local agencies using PPB in various stages of development. As materials were developed they were analyzed by PPBS specialists and their recommendations formed the basis for initial revisions. The opinions of educators were also sought in order to improve the packaging of the materials.

The first field test of the materials was accomplished in late July 1968, during the National Program Planning Conference for State and Local Distributive Education Coordinators held at Utah State University, Logan, Utah, July 29-August 9, 1968.

Further testing took place in late August 1968, when some of the materials were utilized at the National PPBS Conference for Vocational Educators held at Monmouth, Oregon. Comments were solicited and provided the basis for making additional final testing.

Final testing took place during the National Development Institute in Planning, Programming, Budgeting Systems held at the Ohio State University, October 21 through November 1, 1968 for 70 persons with administrative responsibility in vocational education. While the participants primarily represented state education departments in the eastern United States, federal officials, researchers, and teachers from various disciplines also participated. Final editing and refinement was completed during 1968.

A FINAL NOTE

The reader may already be asking himself how to select resource personnel to lead lecture-discussion sessions and to provide guidance during the more inductive or case-problem type sessions. Evidence generated during field tests suggest some guidelines to aid in securing competent persons to assist with the training effort suggested by this program.

While every resource person should have the ability to make a "dynamic," "stimulating," "provocative," and "relevant" contribution, the future institute director will find these persons to be in short supply. Nevertheless it is recommended that dynamic persons who are good speakers, who have the ability to quickly develop rapport with a group, etc., be sought.

Assuming that the previous requirement is met, the future PPBS institute director should insure that resource persons taken as a group have as many as possible of the competences outlined below. The basic areas of expertise are 1) experience in a central budget agency (budgeteer) of a large organization (a state government), 2) participation in a benefit/cost study (economist), 3) management analysis of a large agency (state administrative analyst), 4) a person very familiar with the subject area (vocational education, secondary education, adult education, etc.), and 5) a person knowledgeable in political decision-making (political scientist). Beyond this, a further stipulation of credentials is not too useful unless the other variables (such as clientele group, time limits, size of group, etc.) are known.

AN EDUCATIONAL TRAINING PROGRAM IN PPBS

PART II

SECTION 1

OVERVIEW OF PPBS

A. *Objective.* The objective of this section is to provide the learner with an overview of the general knowledge related to the philosophy, theory, methodology, and practice of PPBS.

B. *Desired Outcomes.* If the general objective of this section has been achieved the learner should be able to:

1. Identify early approaches to resource allocation.
2. Differentiate between an early approach to resource allocation and PPBS.
3. Identify the program structure of a PPBS system.
4. Identify the theoretical bases of PPBS.

C. *Prerequisite.* None. See E below; the instructor may find it useful to know the extent of familiarity of the students with the content and thus wish to pretest all or some of the students.

D. *Placement of Section in Sequence.* It is recommended that learners become aware of the concepts presented in this section before progressing to other sections. The instructor may add to this basic section by drawing from the other sections which follow depending upon the objectives, time, clientele, etc.

E. *Pre-evaluation.* As a general indicator as to the achievement level of the group, it is suggested that the pretests (in Part IV of this volume) be administered.

F. *Minimum Time Estimate.* Approximately two to four hours of lecture-discussion should be devoted to learning activity designed to reach a satisfactory level of performance for this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
Overview - Concepts and Philosophy	19
1. Definition of PPBS	20, 21
2. Evolution of PPBS	22,23
a. Historical Development	24
b. Scientific Management	24
3. Limitations of Past Systems	25, 26
4. Basis of PPBS	

    a. Economics 27
    b. Systems Analysis 28
5. Program Structure 29-30
6. Program Budgeting 31, 32
7. Characteristics of PPBS
    a. Purposes 33
    b. Exclusions 34
    c. Requirements 35

H. *Suggested Instructional Activities.*

1. The instructor may reproduce, xerox, or stencil copies of these guidelines for use in a seminar. The instructional activities noted below may be applied in varying degrees to the related sections; some are not repeated for each section.
2. Part or all of Section 1 may be reproduced on transparencies for use as lecture aids with a large group.
3. The learners may be asked to develop a presentation of the evolution of PPBS which identifies the limitations of the system and the advantages over previous systems.
4. The learners may prepare a report contrasting budgeting procedures of the 1930's with PPBS of today.
5. The learners may be asked to critique some of the case problems or cost-benefit studies references in this and other sections.
6. The learners may be asked to complete Step I, Analysis of a Traditional Budget, in *Volume II: A Case Problem.*

I. *Reference Material.* The following reference material may be used to develop and increase the learner's knowledge and skills in this area.

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. Joseph H. McGivney, "A More Rational Approach to Decision Making in Vocational Education," *American Vocational Journal*, May 1969.
4. Harry P. Hatry and John F. Cotton, *Program Planning for State A System's Approach* (Englewood Cliffs: Prentice Hall Inc., 1968).
5. Harry P Hatry and John F. Cotton, *Program Planning for State County City* (Washington, D.C., George Washington University, 1967).
6. David Novick (ed.), *Program Budgeting* (Cambridge: Harvard University Press, 1965).
7. *Public Administration Review*, Vol. XXVI, No. 5, (December 1966).

J. *Instructional Aids*--pages 19 through 35.

Overview - Concepts and Philosophy

CONCEPTS AND PHILOSOPHY

PLANNING-PROGRAMMING-BUDGETING IS A METHODOLOGY FOR ORGANIZING INFORMATION TO IMPROVE DECISIONS HAVING TO DO WITH THE ALLOCATION OF RESOURCES.

THIS IS ACCOMPLISHED BY:

1. AN EXPLICIT DELINEATION OF OBJECTIVES IN QUANTITATIVE TERMS
2. A SYSTEMATIC COMPARISON OF THE BENEFITS AND COSTS OF ALTERNATIVE OBJECTIVES AND ALTERNATIVE METHODS FOR THEIR ACCOMPLISHMENT
3. THE PROJECTION OF ACTIVITIES OVER AN ADEQUATE TIME HORIZON

PLANNING

THE PROCESS OF DETERMINING OBJECTIVES AND SPECIFYING ALTERNATIVE METHODS OF ACHIEVING OBJECTIVES

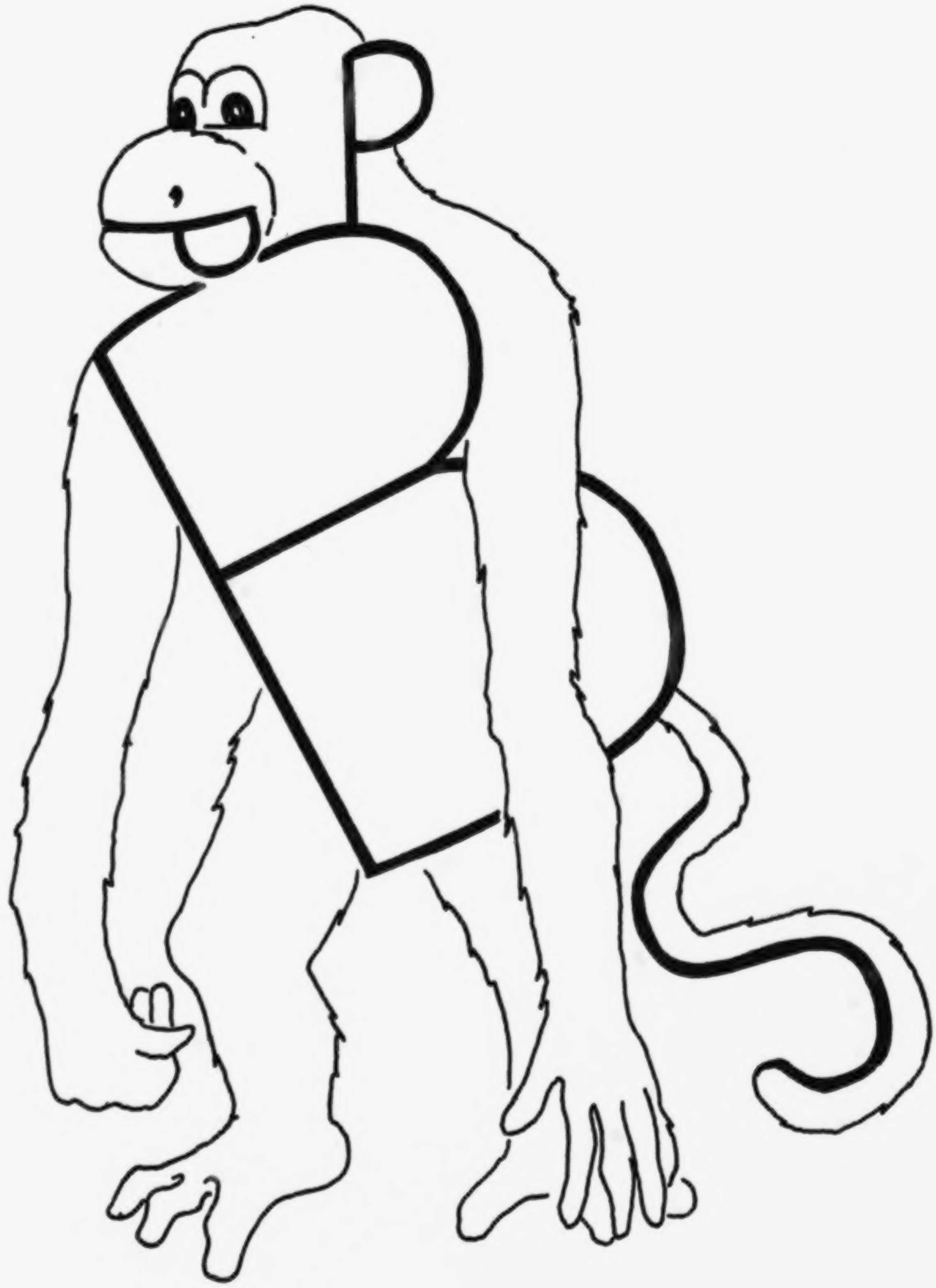
PROGRAMMING

THE PROCESS OF OPTIMIZING THE MIX OF RESOURCES (INPUTS) NECESSARY TO ATTAIN A SPECIFIED OBJECTIVE

BUDGETING

THE PROCESS OF SYSTEMATICALLY RELATING THE EXPENDITURE OF FUNDS TO THE ACCOMPLISHMENT OF OBJECTIVES

The Evolution of PPBS



THE EVOLUTION OF PPBS

OPERATIONS RESEARCH TECHNIQUES

1910 FAYOL-TAYLOR (PRINCIPLES OF SCIENTIFIC MGT.)
1920's PRIVATE SECTOR (DUPONT ET AL.)
1940's WAR RESOURCES PLANNING
1940-50's NATURAL RESOURCES PLANNING (ECONOMISTS)
1954 NOVICK AND RAND CORPORATION RECOMMEND PPB FOR DEFENSE
1957 SCHULTZ ET AL.--ECONOMICS OF EDUCATION
1950's COMPUTERS EMERGE
1960 ECONOMICS OF DEFENSE (HITCH AND McKEAN)
1961 McNAMARA AND HITCH IN DOD
1960's WISCONSIN, NEW YORK AND 5-5-5

PUBLIC SECTOR BUDGET REFORM

1920 CONTROL
1930's CONTROL AND MANAGEMENT
1950-60's CONTROL, MANAGEMENT AND PLANNING

1965 PRESIDENT'S ANNOUNCEMENT TO CABINET
BUREAU OF BUDGET CIRCULAR, 66-3
1968 STATE OF THE UNION MESSAGE IN FIVE YEAR PROGRAM TERMS

EARLY HISTORY AND CONCEPTS OF RATIONAL APPROACHES

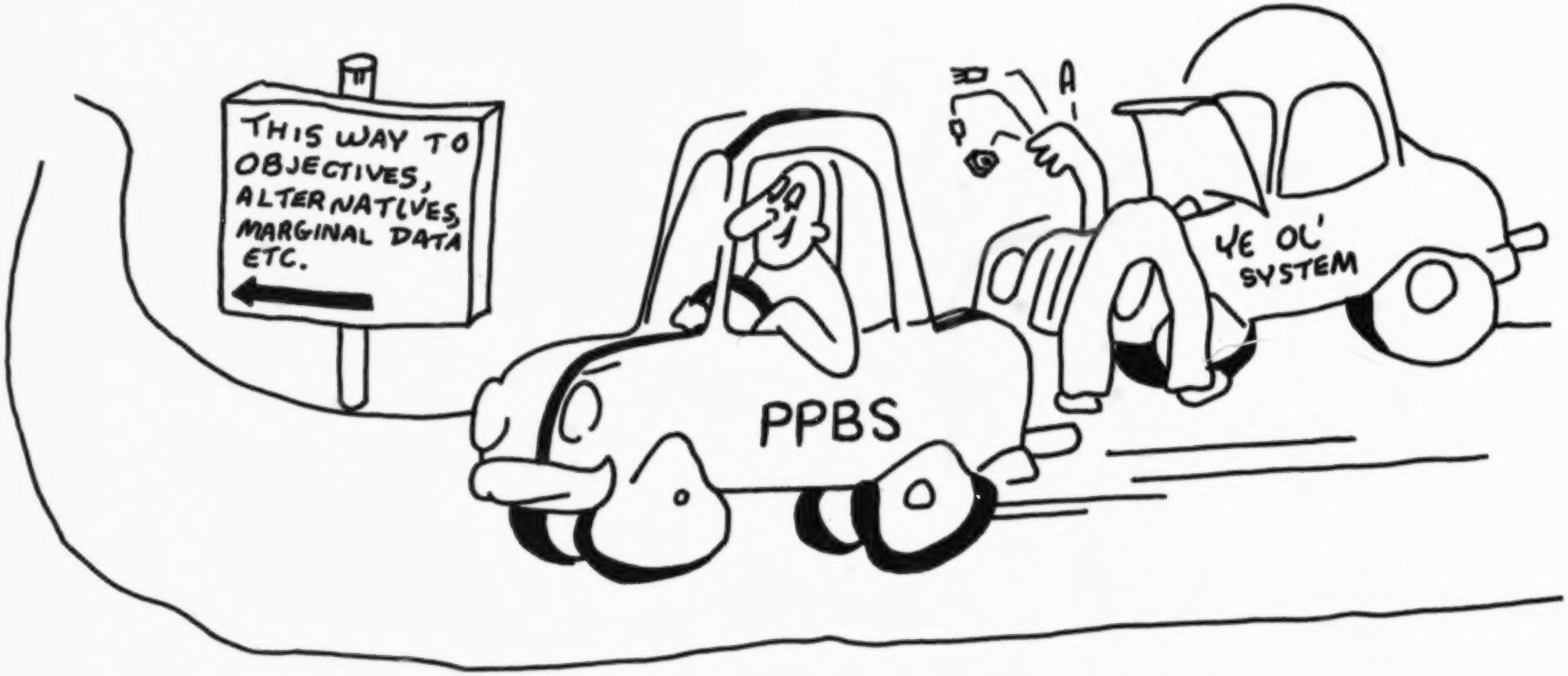
SCIENTIFIC MANAGEMENT

FREDERIC TAYLOR, GANTT AND GILBRETH AND PRINCIPLES OF SCIENTIFIC MANAGEMENT

1. A SCIENCE FOR EACH ELEMENT OF A MAN'S WORK
2. TRAIN, TEACH AND DEVELOP THE WORKMAN SCIENTIFICALLY
3. MANAGEMENT MUST COOPERATE WITH WORKMEN TO INSURE THAT WORK IS DONE IN ACCORDANCE WITH THE PRINCIPLES OF SCIENCE
4. EQUAL RESPONSIBILITY BETWEEN MANAGEMENT AND WORKMAN (MEANING THE WORKMAN WAS TO DO WHAT HE WAS TOLD TO DO)

THE MECHANISMS TO ACHIEVE SCIENTIFIC MANAGEMENT

1. TIME AND MOTION STUDIES
2. STUDY AND ANALYSIS OF MACHINES AND TOOLS
3. STANDARDIZATION
4. TASK DEFINED: A GIVEN AMOUNT OF WORK IN A SET AMOUNT OF TIME
5. BONUS PLAN: AN INCENTIVE TO PRODUCE
6. FUNCTIONAL FOREMANSHIP
7. SEVEN OTHERS WERE LISTED BY TAYLOR


THIS WAY TO OBJECTIVES, ALTERNATIVES, MARGINAL DATA ETC.
PPBS
YE OL' SYSTEM

Limitations of Past Systems

LIMITATIONS OF PAST SYSTEMS

UNABLE TO SPECIFY CONCRETELY THE ACCOMPLISHMENTS OF EXISTING ACTIVITIES

UNABLE TO SPECIFY THE EXPECTED ACCOMPLISHMENTS OF NEW ACTIVITIES OR PROGRAMS

1. DID NOT EXPLICITLY IDENTIFY ALTERNATIVES, OBJECTIVES AND/OR PROGRAMS
2. DID NOT CONSIDER FUTURE YEAR COSTS
3. DID NOT CONSIDER MARGINAL DATA

CONCENTRATED ON EFFICIENCY (REDUCTION OF COSTS) RATHER THAN VALUE (NET BENEFITS)

FOCUSED ON INPUTS (SALARIES, EQUIPMENT) RATHER THAN ON OUTPUTS (VALUE ADDED)

CONCEPTUAL BASIS OF PPBS

ECONOMICS: THE SOCIAL SCIENCE THAT IS CONCERNED WITH THE ALLOCATION OF SCARCE RESOURCES TO ATTAIN THE MAXIMUM SATISFACTION OF OUR UNLIMITED WANTS

1 SCARCE RESOURCES: THERE IS NEVER ENOUGH OF ANYTHING TO DO EVERYTHING.

2 OPPORTUNITY COSTS: THE COST OF ANY KIND OF ACTION OR DECISION CONSISTS OF THE OPPORTUNITIES BENEFITS THAT ARE SACRIFICED IN TAKING THAT ACTION.

3 SUNK COSTS: THE COSTS OF INPUTS WHICH HAVE BEEN USED UP OR CANNOT BE SALVAGED FROM A PRODUCTION PROCESS. THESE COSTS ARE IRRELEVANT TO DECISIONS CONCERNING THE FUTURE, ONLY FUTURE COSTS ARE IMPORTANT.

4 EFFICIENCY: ATTAINMENT OF THE MOST VALUE FOR A GIVEN COST.

5 ECONOMY: ATTAINMENT OF A GIVEN OBJECTIVE FOR THE LEAST COST.

SYSTEMS ANALYSIS: A FRAMEWORK FOR VISUALIZING INTERNAL AND EXTERNAL ENVIRONMENTAL FACTORS AS AN INTEGRATED WHOLE

1 NATURAL SYSTEMS

2 MANMADE SYSTEMS

3 HIERARCHY OF SYSTEMS

4 ORGANIZATIONS AS SYSTEMS

5 INFORMATION SYSTEMS

6 OPEN SYSTEMS

7 CLOSED SYSTEMS

8 TOTAL SYSTEMS

9 MODELS OF SYSTEMS

PROGRAM STRUCTURE OF A PPBS SYSTEM

AN ORGANIZED ASSEMBLY OF ALL OF AN AGENCY'S ACTIVITIES (INPUTS) IN TERMS OF THE OUTPUTS OF GOODS AND SERVICES ESSENTIAL TO MEET ITS VARIOUS OBJECTIVES. A PROGRAM STRUCTURE CONSISTS OF THE HIERARCHICAL BREAKDOWN, GROUPING, AND ORDERING OF THE TOTAL WORK OF AN AGENCY.

TERMINOLOGY FOR PPBS AND PROGRAM BUDGETS

MISSION: DESCRIPTION OF THE ORGANIZATION'S REASON FOR EXISTENCE; USUALLY IMPOSED BY LAW; CORRESPOND TO PROGRAM

GOALS: LONG-RANGE ACCOMPLISHMENTS TOWARDS WHICH THE ORGANIZATION'S EFFORTS ARE DIRECTED; CORRESPOND TO PROGRAM CATEGORIES

OBJECTIVES: MEASURABLE OUTPUTS AND SPECIFIED QUALITY, QUANTITY, AND TIME; CORRESPOND TO PROGRAM ELEMENTS

PROGRAM: A MAJOR ORGANIZATIONAL ENDEAVOR

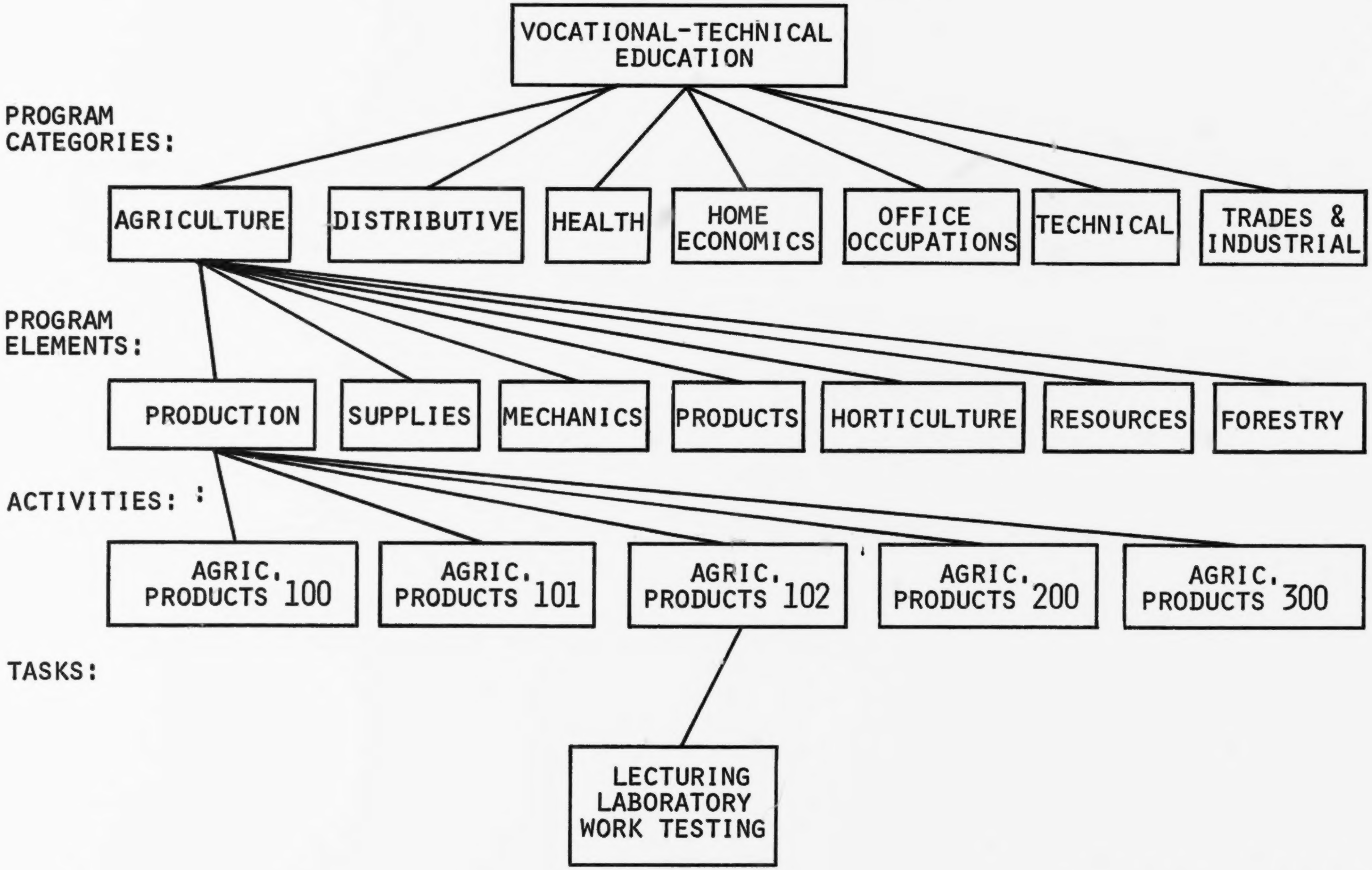
PROGRAM CATEGORY: A GROUPING OF PROGRAM ELEMENTS WHICH HAVE SIMILAR OUTPUTS

PROGRAM ELEMENT: BASIC UNIT OF PROGRAM STRUCTURE WHICH HAVE CLEARLY DEFINED OUTPUTS

ACTIVITIES: THE METHOD BY WHICH OBJECTIVES ARE ATTAINED

TASKS: AN ASPECT(S) OF AN ACTIVITY

EXAMPLE OF PROGRAM STRUCTURE


PROGRAM:
VOCATIONAL-TECHNICAL EDUCATION
PROGRAM CATEGORIES:
AGRICULTURE
DISTRIBUTIVE
HEALTH
HOME ECONOMICS
OFFICE OCCUPATIONS
TECHNICAL
TRADES & INDUSTRIAL
PROGRAM ELEMENTS:
PRODUCTION
SUPPLIES
MECHANICS
PRODUCTS
HORTICULTURE
RESOURCES
FORESTRY
ACTIVITIES:
AGRIC. PRODUCTS 100
AGRIC. PRODUCTS 101
AGRIC. PRODUCTS 102
AGRIC. PRODUCTS 200
AGRIC. PRODUCTS 300
TASKS:
LECTURING
LABORATORY
WORK TESTING

PROGRAM AND FINANCIAL PLANS ARE:

1 MULTI-YEAR USUALLY 5 YEARS

2 STRUCTURED ACCORDING TO PROGRAM CATEGORIES

3 DESIGNED TO SHOW RESOURCE INPUTS AND UTILITY OUTPUTS, PLUS DOLLARS FOR EACH

4 DESIGNED TO SHOW FUTURE IMPLICATIONS LINKED TO OR IMPLIED BY CURRENT INVESTMENT DECISIONS

5 HELPFUL IN PREVENTING "FOOT-IN-THE-DOOR" FINANCING

6 STATEMENTS OF OBJECTIVES AND PLANNED ACCOMPLISHMENT IN QUANTITATIVE TERMS

PROGRAM BUDGETING TRIES TO ATTACH BENEFITS AND COSTS TO PROGRAMS, OVER TIME, IT:

1 FOCUSES ON INPUTS AND OUTPUTS RATHER THAN INPUTS ALONE

2 FOCUSES ON EXPECTED ACCOMPLISHMENTS RATHER THAN PAST PERFORMANCE OF A PERSON, GROUP OR ACTIVITY

3 EMPHASIZES PLANNING RATHER THAN CONTROL

EXAMPLE OF A PROGRAM BUDGET

	1968-69		1969-70		1970-71		1971-72		1972-73	
	INPUTS COSTS	OUTPUTS BENEFITS	INPUTS COSTS	OUTPUTS BENEFITS	INPUTS COSTS	OUTPUTS BENEFITS	INPUTS COSTS	OUTPUTS BENEFITS	INPUTS COSTS	OUTPUTS BENEFITS
PROGRAM: VO.-TECH. ED.	$X	X	$X	X	$X	X	$X	X	$X	X
PROGRAM CATEGORY: AG. ED.	X	X	X	X	X	X	X	X	X	X
PROGRAM ELEMENT: AG. SUPPLIES	X	X	X	X	X	X	X	X	X	X
OPERATING COSTS	X		X		X		X		X	
PERSONNEL	X		X		X		X		X	
MATERIALS	X		X		X		X		X	
TOTAL	X		X		X		X		X	
CAPITAL COSTS	X		X		X		X		X	
DEPRECIATION	X		X		X		X		X	
BUILDING COSTS	X		X		X		X		X	
TOTAL	X		X		X		X		X	

PPBS ATTEMPTS:

1 TO MAKE THE DECISION MAKING PROCESS EXPLICIT

2 TO ASSURE THE DECISION MAKER A CHOICE OF VALID COMPARABLE ALTERNATIVES

3 TO EXPRESS THE INGREDIENTS FOR DECISIONS IN CONCRETE QUANTIFIABLE TERMS, AND WHEN THEY CANNOT BE QUANTIFIED, IT ATTEMPTS TO BE EXPLICIT ABOUT THE INCOMMENSURABLES

4 TO BUILD IN A DIMENSION OVER TIME THAT TRIES TO SEE TODAY'S DECISIONS IN TERMS OF THEIR LONGER TERM CONSEQUENCES

5 TO TAKE ACCOUNT OF ALL COSTS INHERENT IN DECISIONS

6 TO INSTITUTIONALIZE CHANGE BY PROVIDING CONTINUING ANALYSIS OF GOALS AND OBJECTIVES AND PROGRAMS

7 TO RELATE THE WEALTH OF DATA AVAILABLE ON ALMOST ANY SUBJECT OR ISSUE IN A WAY THAT IS USEFUL TO DECISION MAKERS

PPBS WHAT IT IS NOT

1 REVOLUTIONARY--ITS INGREDIENTS ARE LARGELY NOT NEW, EXCEPT IN THEIR ARRANGEMENT AND USE

2 A SUBSTITUTE FOR JUDGMENT, OPINION, EXPERIENCE, AND WISDOM

3 AN ATTEMPT TO COMPUTERIZE THE DECISION MAKING PROCESS

4 JUST ANOTHER WAY TO SAVE MONEY OR CUT EXPENDITURES

5 JUST ANOTHER BUDGET

6 AND PPBS IS SURELY NOT THE ANSWER TO EVERY PROBLEM INVOLVING EVERY ISSUE

PPBS REQUIRES IN EACH AGENCY THE EXISTENCE OF:

1 PERMANENT SPECIALIZED STAFF CARRYING OUT CONTINUING IN-DEPTH ANALYSIS OF THE AGENCY'S OBJECTIVES AND ITS PROGRAMS TO MEET THEM

2 A MULTI-YEAR PLANNING AND PROGRAMMING PROCESS AS A BASIS FOR MAJOR DECISIONS BY AGENCY HEADS AND SUPER-ORDINATE DECISION MAKERS (GOV.-LEGISLATURE)

3 A BUDGETING PROCESS WHICH CAN TAKE BROAD PROGRAM DECISIONS AND TRANSLATE THEM INTO THE CONTEXT OF A DETAILED BUDGET SUBMISSION

4 STRONG ENDORSEMENT BY THE HEAD OF THE AGENCY

SECTION 2

SYSTEMS THEORY

A. *Objective.* The objective of this section is to provide the learner with knowledge and skills related to the major concepts of systems theory.

B. *Desired Outcomes.* If the general objective of this section has been achieved the learner should be able to:

1. Differentiate between natural and man-made systems.
2. Identify the hierarchial levels of a particular system.
3. Describe some parameters of the American value system in which Boards of Education operate.
4. Identify some necessary elements of an information system.
5. Differentiate between the role of the systems designer and the systems manager.
6. Differentiate between formal and informal systems.
7. Differentiate between open and closed systems.

C. *Prerequisites.* Knowledge of the elements and conceptual basis of PPBS presented in Section 1 or its equivalent.

D. *Placement of Section in Sequence.* This section may be used independently. It is recommended that it be used before the presentation of Sections 3 through 9.

E. *Pre-evaluation.* The learner should demonstrate proficiency in the general overview, Section 1, before being introduced to this section; he may be evaluated on any or all of the specific objectives of Section 1.

F. *Minimum Time Estimate.* Approximately three hours should be utilized in the presentation of this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
Systems Theory - What is a System?	39
1. Definition of a System	40
2. Types of Systems	41
a. Natural Systems	42
b. Man-made Systems	43, 44
c. Value Systems	45-48
d. Information Systems	49
3. Models and Systems	50-54

H. *Suggested Instructional Activities.*

1. The learners may be asked to present an analysis of their organization as a man-made system.
2. The learners may be asked to begin Step II, Manpower Needs, in *Volume II: A Case Problem.*
3. Brief problem exercises may be developed from the "Desired Outcomes" for individual study.

I. *Reference Material.* The following references may be used to develop and increase the learner's knowledge and skills in this area.

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. J. H. Greene, *Operations Planning and Control* (Homewood, Illinois; Irwin, Inc., 1967).
4. J. Pfieffer, *New Look at Education: Systems Analysis in Our Schools and Colleges* (New York: Odyssey Press, 1968).
5. E. S. Quade, *Systems Analysis Techniques for Planning, Programming Budgeting* (Santa Monica, California: Rand Corp., 1966).
6. J. A. Kershaw and R. N. McKean, *Systems Analysis and Education* (Santa Monica: Rand Corp., 1959).

J. *Instructional Aids*--pages 39 through 54.

SEE
IT HERE
A
SYSTEM!
SYSTEM
SHOWN
HERE
SYSTEM
TODAY
UNVEILING
TODAY!
SEE
THE
SYSTEM
System

Systems Theory -
What Is a System?

DEFINITIONS OF A SYSTEM

A SYSTEM IS A SET OF ELEMENTS SO INTERRELATED AND INTEGRATED THAT THE WHOLE DISPLAYS UNIQUE ATTRIBUTES - H. L. TIMMS

THE IDEA OF A SYSTEM IS ADDRESSED NOT TO AN INDIVIDUAL PHENOMENON, BUT TO THE TOTAL PATTERN OF PHENOMENON THAT CREATES AN ENVIRONMENT AND A STATE OF BEING FOR A GIVEN PROCESS - S. L. OPTNER

A COMPLEX UNIT FORMED OF MANY OFTEN DIVERSE PARTS SUBJECT TO A COMMON PLAN OR SERVING A COMMON PURPOSE - WEBSTER'S UNABRIDGED DICTIONARY

THE SYSTEM CONCEPT IS PRIMARILY A WAY OF THINKING ABOUT THE JOB OF MANAGING, IT PROVIDES A FRAMEWORK FOR VISUALIZING INTERNAL AND EXTERNAL ENVIRONMENTAL FACTORS AS AN INTEGRATED WHOLE - JOHNSON, KAST AND ROSENZWEIG

TYPES OF SYSTEMS

NATURAL SYSTEMS
- SOLAR
- BIOLOGICAL
  - CIRCULATORY
  - NERVOUS

MAN MADE SYSTEMS
- SOCIAL
- POLITICAL
- LEGAL
- ECONOMIC
- EDUCATIONAL

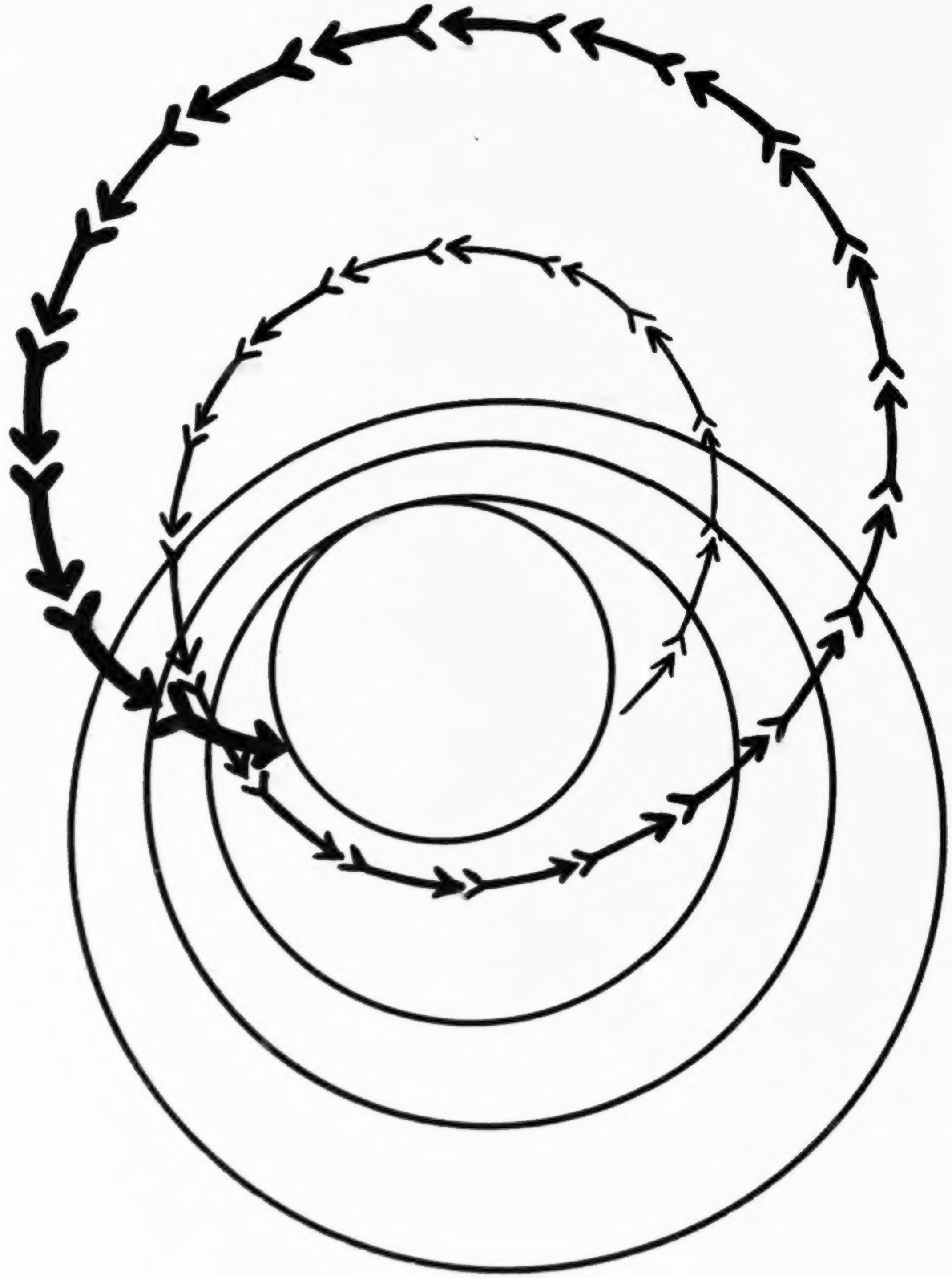
TYPES OF HIERARCHY IN SYSTEMS

MACRO

MICRO

MINI-MICRO OR SUBSYSTEMS

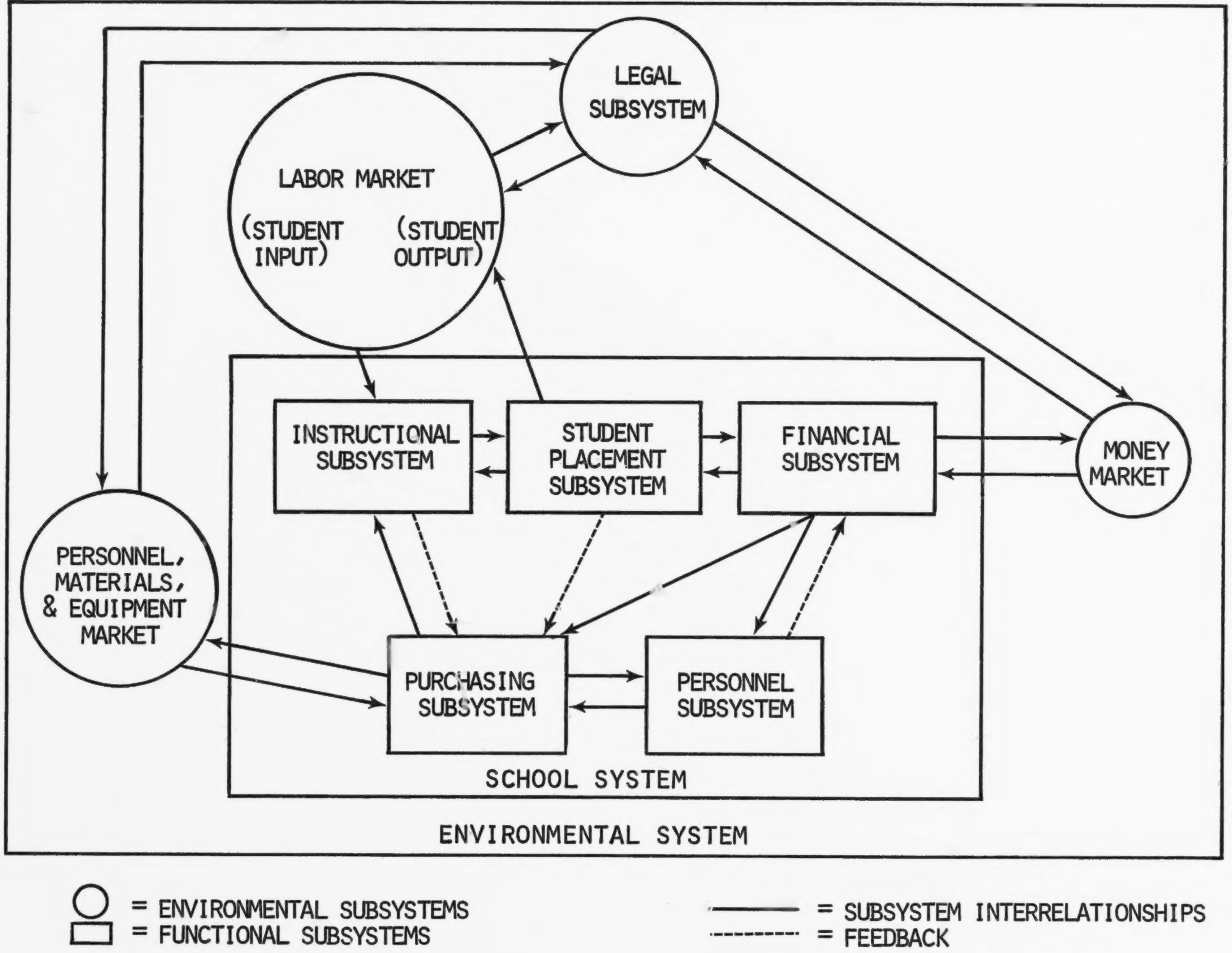
PERSPECTIVE OF OBSERVER

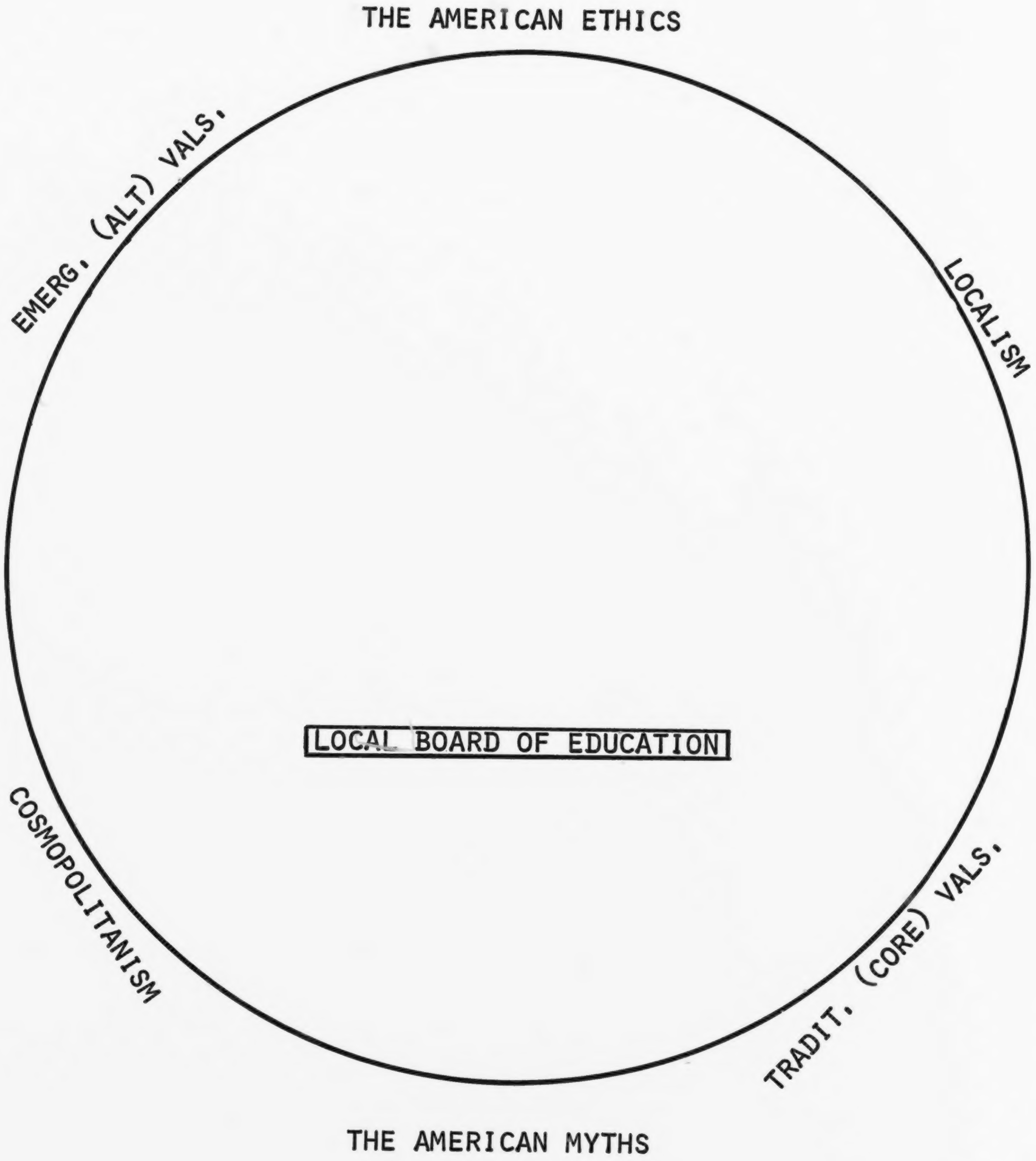


Natural Systems

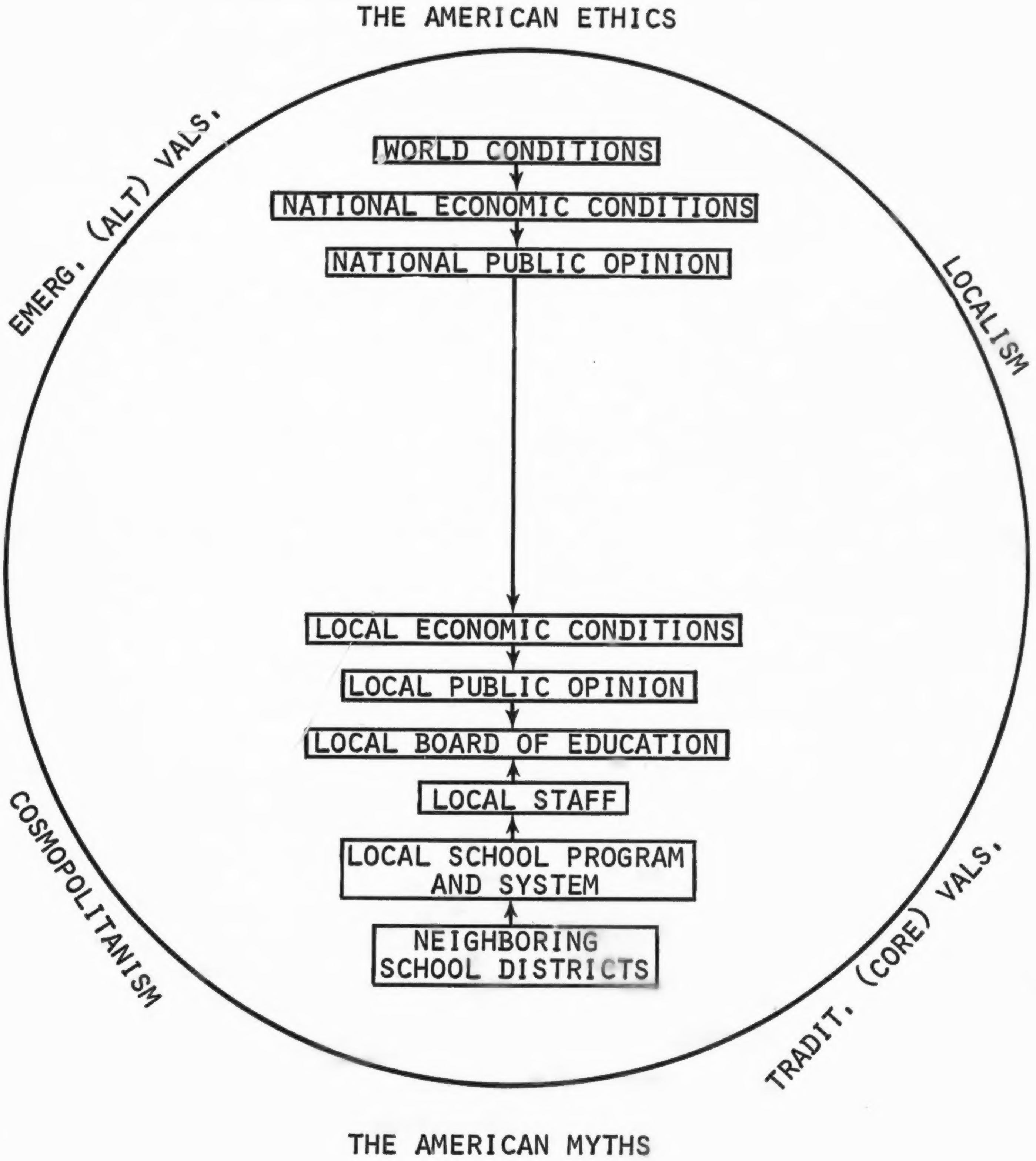
Man Made Systems

AN EDUCATIONAL ORGANIZATION AS A SYSTEM

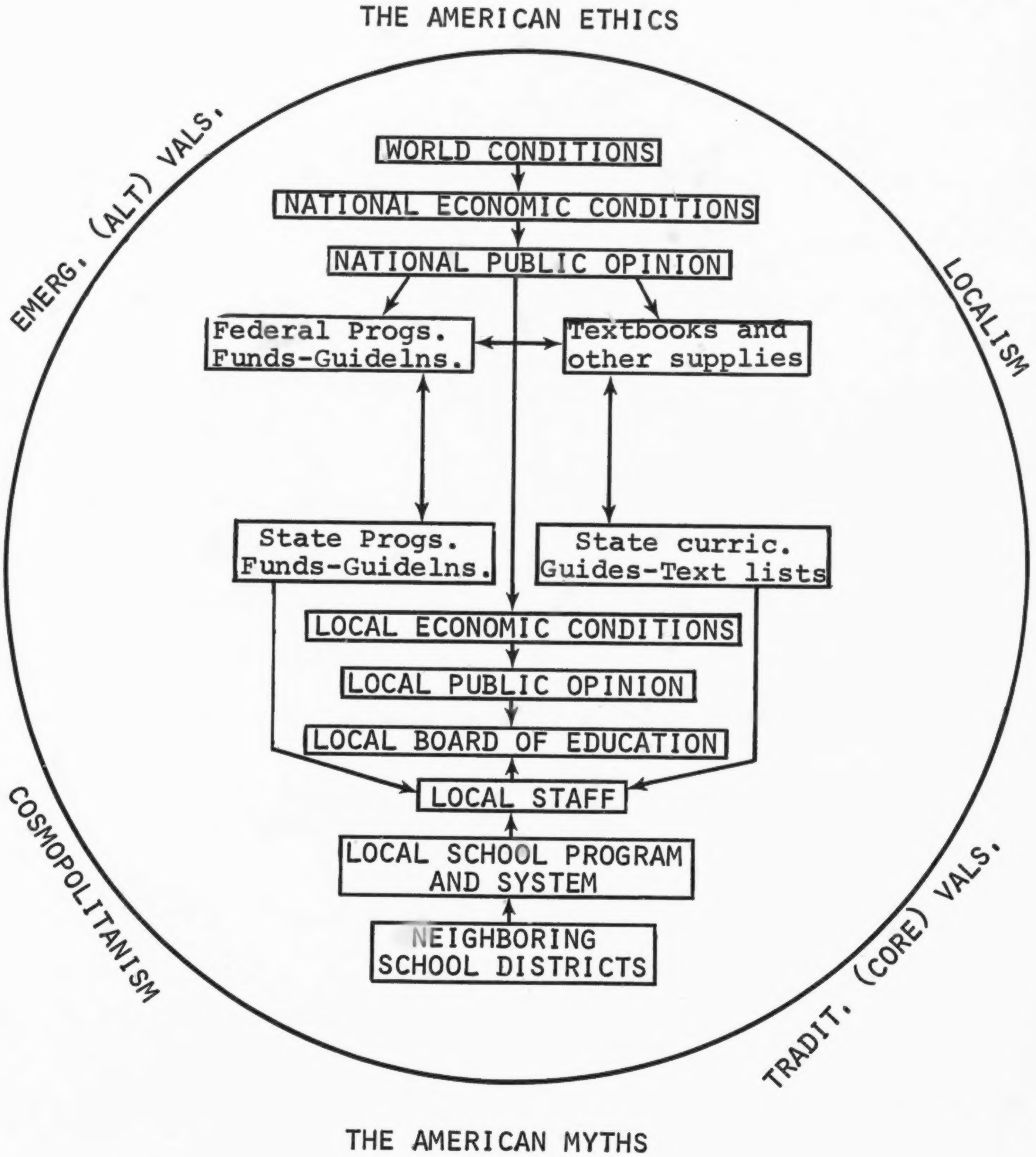

LEGAL SUBSYSTEM
LABOR MARKET
(STUDENT INPUT)
(STUDENT OUTPUT)
INSTRUCTIONAL SUBSYSTEM
STUDENT PLACEMENT SUBSYSTEM
FINANCIAL SUBSYSTEM
MONEY MARKET
PERSONNEL, MATERIALS, & EQUIPMENT MARKET
PURCHASING SUBSYSTEM
PERSONNEL SUBSYSTEM
SCHOOL SYSTEM
ENVIRONMENTAL SYSTEM
○ = ENVIRONMENTAL SUBSYSTEMS
□ = FUNCTIONAL SUBSYSTEMS
= SUBSYSTEM INTERRELATIONSHIPS
= FEEDBACK


THE AMERICAN ETHICS
EMERG. (ALT) VALS.
LOCALISM
LOCAL BOARD OF EDUCATION
COSMOPOLITANISM
TRADIT. (CORE) VALS.
THE AMERICAN MYTHS

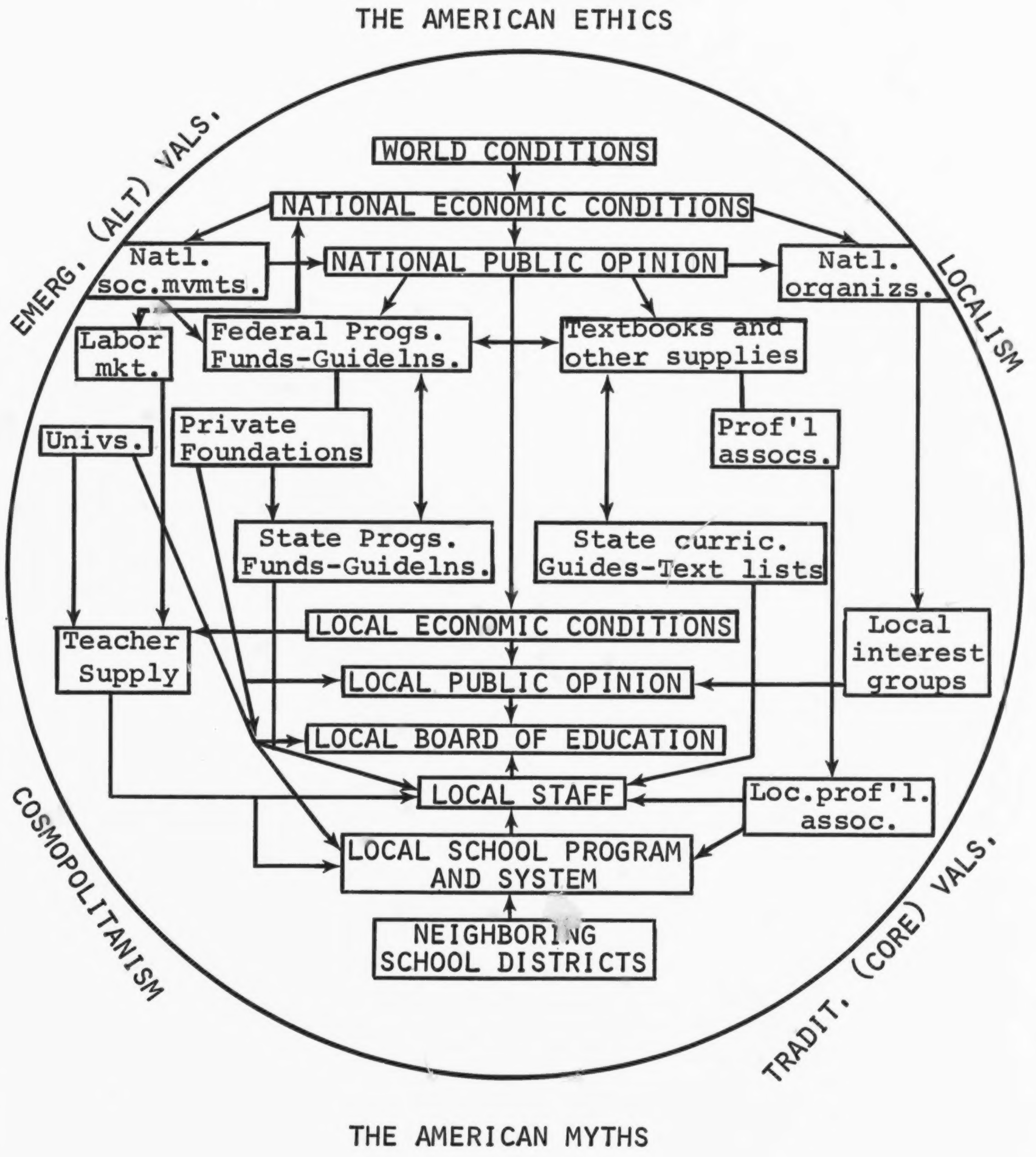
LOCAL BOARDS OF EDUCATION WORK WITHIN THE AMERICAN VALUE SYSTEM


THE AMERICAN ETHICS
EMERG. (ALT) VALS.
LOCALISM
WORLD CONDITIONS
NATIONAL ECONOMIC CONDITIONS
NATIONAL PUBLIC OPINION
LOCAL ECONOMIC CONDITIONS
LOCAL PUBLIC OPINION
LOCAL BOARD OF EDUCATION
LOCAL STAFF
LOCAL SCHOOL PROGRAM AND SYSTEM
NEIGHBORING SCHOOL DISTRICTS
COSMOPOLITANISM
TRADIT. (CORE) VALS.
THE AMERICAN MYTHS

LOCAL BOARDS OF EDUCATION WORK WITHIN
THE AMERICAN VALUE SYSTEM


THE AMERICAN ETHICS
EMERG. (ALT) VALS.
LOCALISM
WORLD CONDITIONS
NATIONAL ECONOMIC CONDITIONS
NATIONAL PUBLIC OPINION
Federal Progs. Funds-Guidelns.
Textbooks and other supplies
State Progs. Funds-Guidelns.
State curric. Guides-Text lists
LOCAL ECONOMIC CONDITIONS
LOCAL PUBLIC OPINION
LOCAL BOARD OF EDUCATION
LOCAL STAFF
LOCAL SCHOOL PROGRAM AND SYSTEM
NEIGHBORING SCHOOL DISTRICTS
COSMOPOLITANISM
TRADIT. (CORE) VALS.
THE AMERICAN MYTHS

LOCAL BOARDS OF EDUCATION WORK WITHIN
THE AMERICAN VALUE SYSTEM


THE AMERICAN ETHICS
EMERG. (ALT) VALS.
LOCALISM
COSMOPOLITANISM
TRADIT. (CORE) VALS.
WORLD CONDITIONS
NATIONAL ECONOMIC CONDITIONS
Natl. soc.mvmts.
NATIONAL PUBLIC OPINION
Natl. organizs.
Labor mkt.
Federal Progs. Funds-Guidelns.
Textbooks and other supplies
Univs.
Private Foundations
Prof'l assocs.
State Progs. Funds-Guidelns.
State curric. Guides-Text lists
LOCAL ECONOMIC CONDITIONS
Teacher Supply
Local interest groups
LOCAL PUBLIC OPINION
LOCAL BOARD OF EDUCATION
LOCAL STAFF
Loc.prof'l. assoc.
LOCAL SCHOOL PROGRAM AND SYSTEM
NEIGHBORING SCHOOL DISTRICTS
THE AMERICAN MYTHS

LOCAL BOARDS OF EDUCATION WORK WITHIN
THE AMERICAN VALUE SYSTEM

From: William W. Wayson, *Effective School Board Relationships* (Syracuse University: Bureau of School Services, 1966) Mimeo, p.4A.

INFORMATION SYSTEMS

INFORMATION IS CREATED, TRANSMITTED AND RECEIVED IN EACH SUBSYSTEM

EACH SUBSYSTEM'S INFORMATION IDEALLY SHOULD BE INTEGRATED OR USEFUL TO OTHER SUBSYSTEMS - NO SIMPLE TASK

1 SYSTEM DESIGNER (SD) SHOULD KNOW THE DATA NEEDS OF HIGHER LEVEL SYSTEMS BEFORE UNDERTAKING A LOWER SYSTEM'S STUDY

2 SD MUST KNOW WHAT INFORMATION IS NEEDED AT EACH DECISION POINT AND ACTION POINT

3 SD MUST KNOW WHERE INFORMATION IS GENERATED AND IN WHAT FORM IT IS USED

4 SD MUST KNOW MUCH ABOUT THE WORK OF RELATED FUNCTIONAL SUBSYSTEMS TO INTEGRATE THE INFORMATION SYSTEM

TOTAL INFORMATION SYSTEMS

DEFINITION: THE INTEGRATION OF ALL USEFUL INFORMATION FROM EVERY SUBSYSTEM WITHIN AN ORGANIZATION INTO ONE UNIVERSAL COMPUTERIZED DATA BANK WHICH WOULD INCLUDE NECESSARY DATA FOR ACCOUNTING, PLANNING, MANAGEMENT CONTROL AND OPERATIONS CONTROL

ADVANTAGES OF A TOTAL INFORMATION SYSTEM

1 SIMULTANEOUS DESIGN AND INSTALLATION OF TOTAL SYSTEM WOULD NOT REQUIRE CONTINUAL REDESIGN

2 TOTAL SYSTEM WOULD ALLOW EASY ACCESS TO ANY AND ALL INFORMATION FOR ANY SPECIFIC PURPOSE

DISADVANTAGES OF A TOTAL INFORMATION SYSTEM

1 FAILURE OF WHOLE SYSTEM MAY OCCUR IF ANY SUBSYSTEM IS NOT INCLUDED

2 TOTAL SYSTEM WOULD BE VERY LARGE AND COMPLEX TO DESIGN AND INSTALL

3 TOTAL SYSTEM MAY BE DIFFICULT TO ADAPT TO CHANGING CONDITIONS

4 A TOTAL SYSTEM IS AT PRESENT STILL A DREAM

MODELS AND SYSTEMS

DEFINITION OF A MODEL: ANYTHING WHICH DESCRIBES, REFLECTS, OR REPRESENTS AN ACTUAL SYSTEM OR SITUATION INCLUDING RELATIONSHIPS BETWEEN PHENOMENA IN THE SYSTEM

BASIC TYPES OF MODELS	HIGH LEVEL OF CERTAINTY DETERMINISTIC	LOW LEVEL OF CERTAINTY PROBABILISTIC
VERBAL: DESCRIPTION IN WORDS		
SCHEMATIC: GRAPHICAL, CHARTS		
PHYSICAL: MOCK-UPS, SCALE MODELS		
MATHEMATICAL: QUANTITATIVE RELATIONSHIPS		

EXAMPLES OF MODEL APPLICATION

1 AUTOMATIC CONTROL SYSTEMS

2 MICRO-MODELS - AIRLINE SCHEDULES

3 DYNAMIC MACRO-MODELS - U. S. ECONOMY

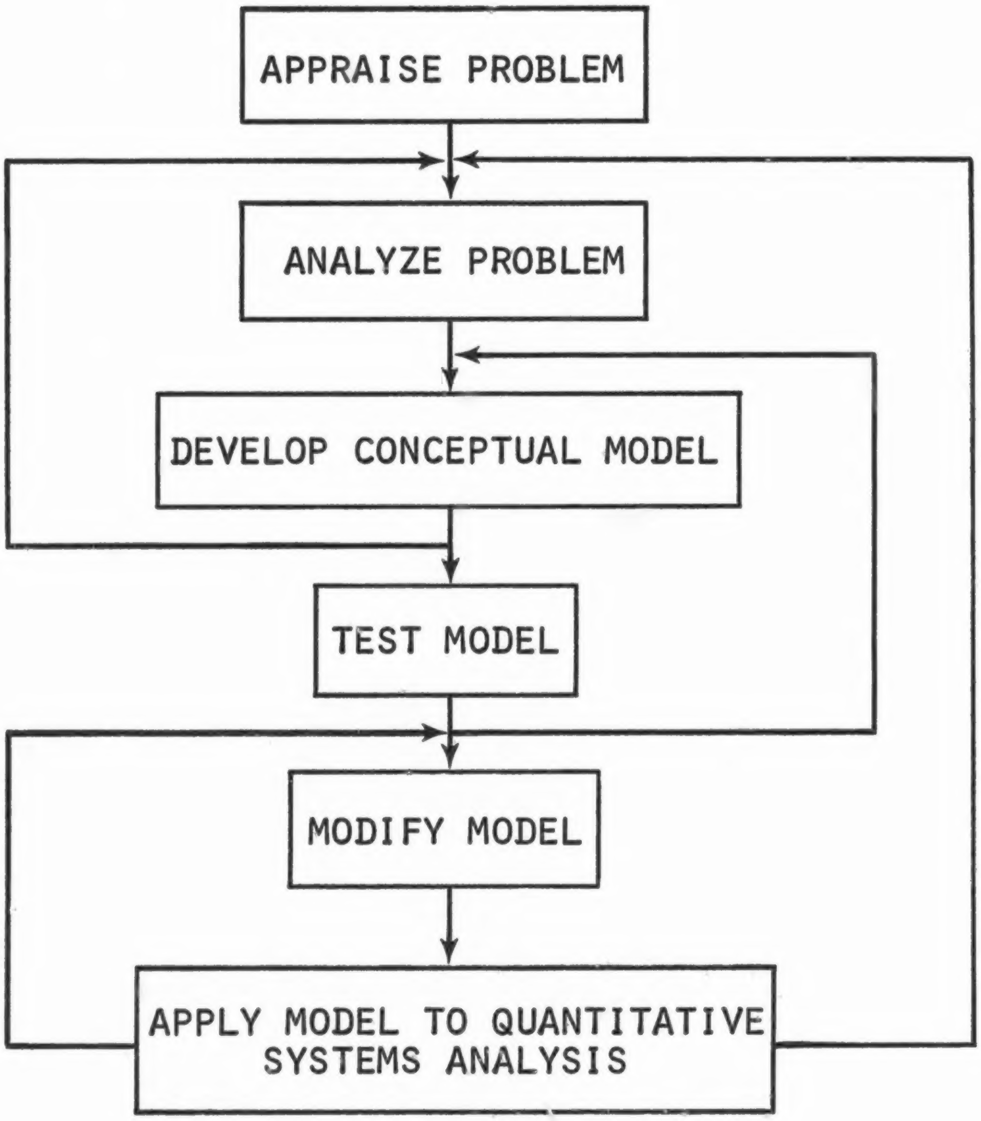
4 MANAGEMENT GAMES

ROLE OF THE SYSTEMS DESIGNER

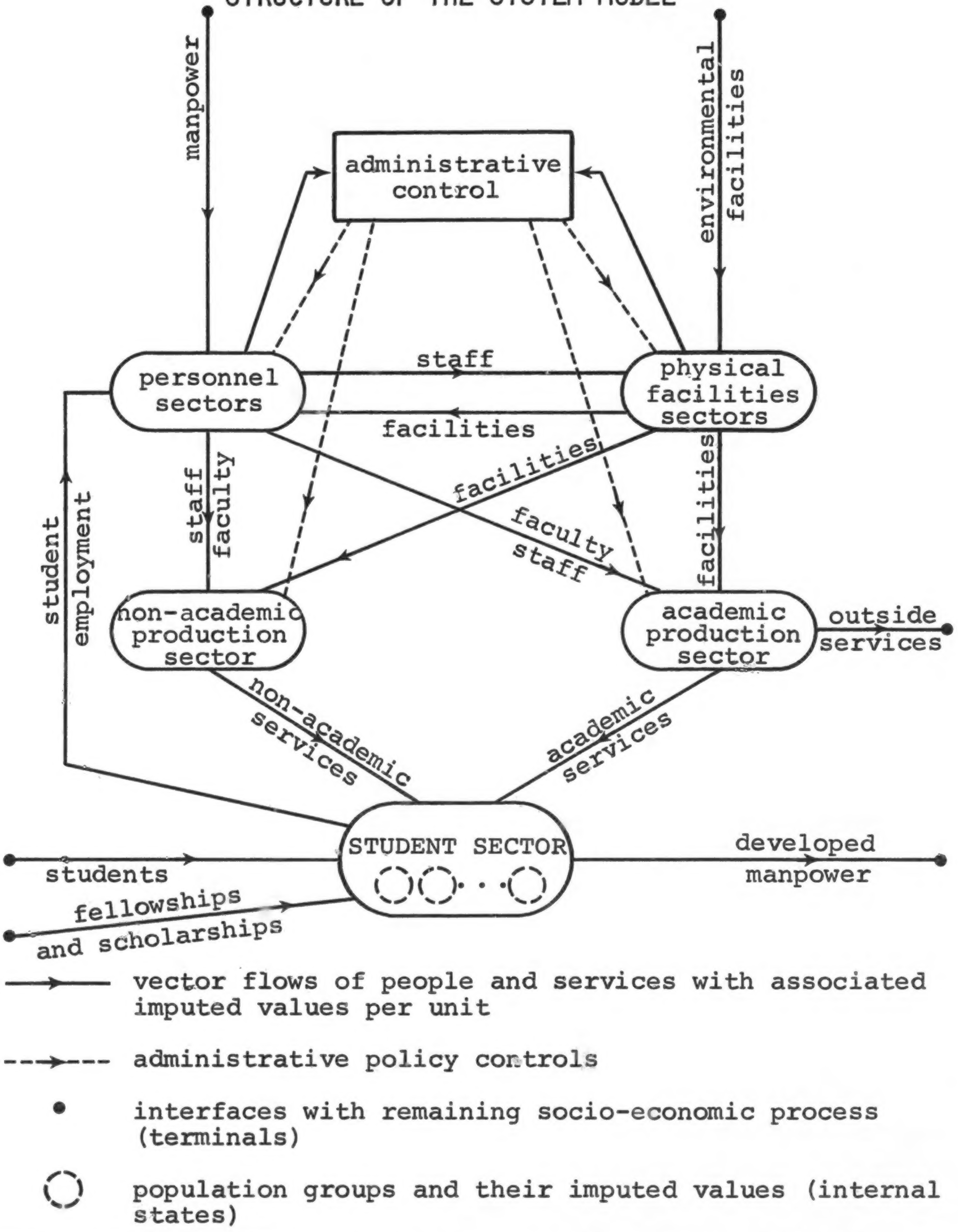
HE DIVISES SYSTEMS THAT PROVIDE MANAGEMENT WITH HELP IN THE DECISION MAKING PROCESS--PREPARATION FOR, IMPLEMENTATION OF AND CONTROL OF THE DECISIONS MADE.

HE DOES NOT MAKE DECISIONS (EXCEPT IN THE SYSTEMS AREA); HE GIVES ADVICE.

ORGANIZATION OF THE QUALITATIVE SYSTEMS ANALYSIS PROCESS

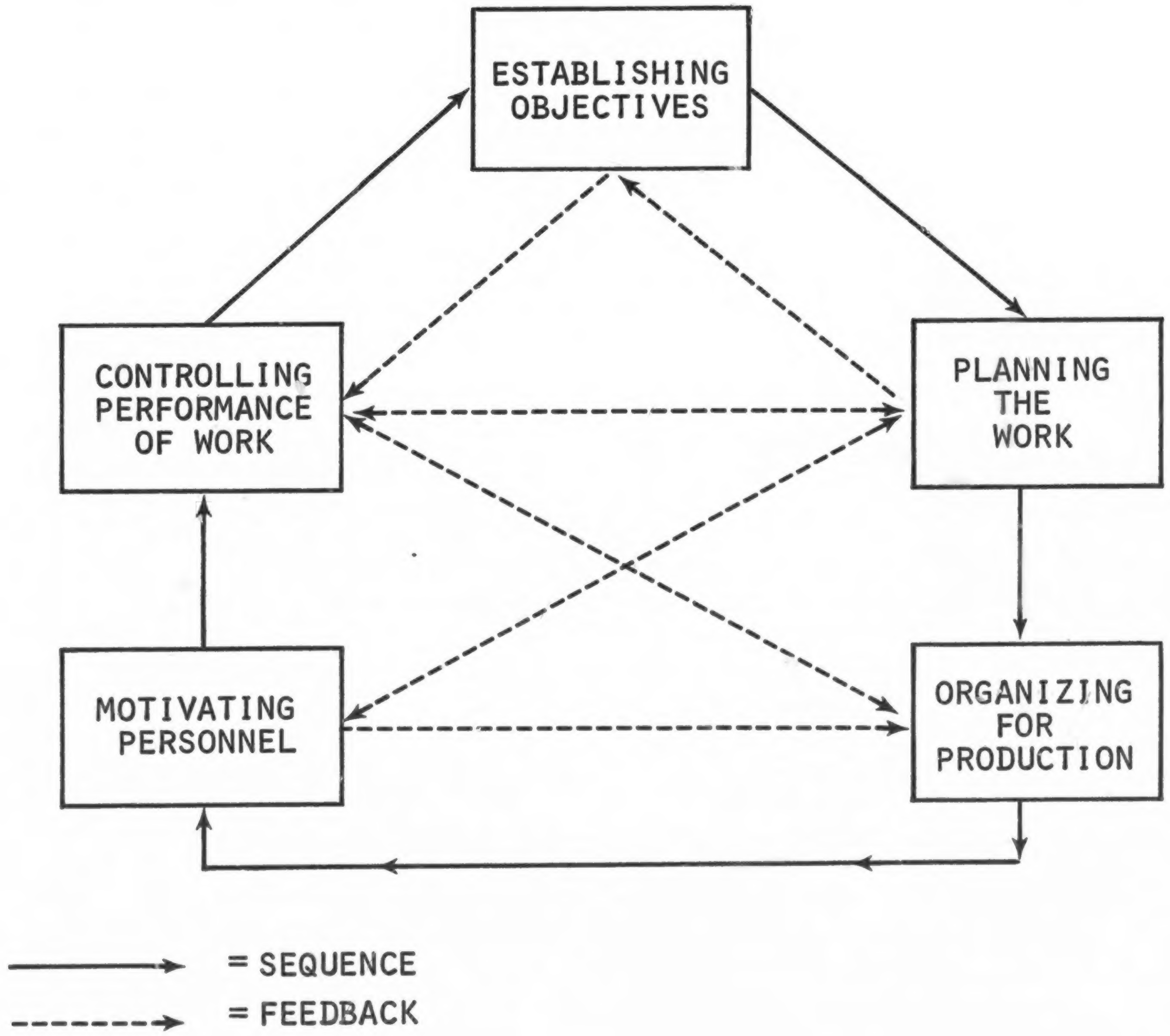

APPRAISE PROBLEM
ANALYZE PROBLEM
DEVELOP CONCEPTUAL MODEL
TEST MODEL
MODIFY MODEL
APPLY MODEL TO QUANTITATIVE SYSTEMS ANALYSIS

STRUCTURE OF THE SYSTEM MODEL

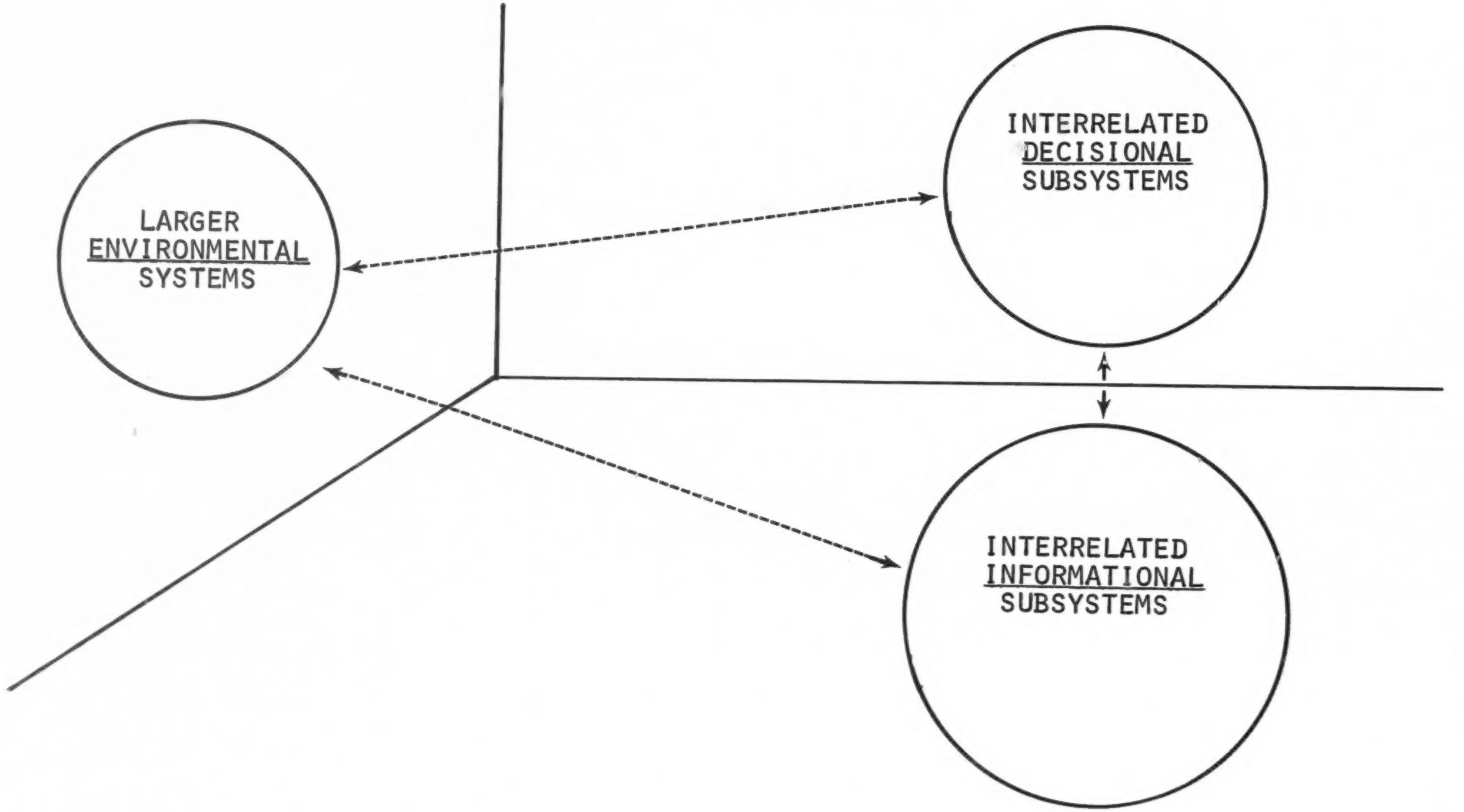

manpower
environmental facilities
administrative control
personnel sectors
staff
facilities
physical facilities sectors
staff faculty
facilities
faculty staff
facilities
student employment
non-academic production sector
academic production sector
outside services
non-academic services
academic services
STUDENT SECTOR
students
developed manpower
fellowships and scholarships
vector flows of people and services with associated imputed values per unit
administrative policy controls
interfaces with remaining socio-economic process (terminals)
population groups and their imputed values (internal states)

From: H. E. Koenig, M. G. Keeney, and R. Zemack, *Systems Analysis and Planning in University Administration* (East Lansing: Michigan State University, 1967).

SYSTEMS MODEL OF THE MANAGEMENT PROCESS


ESTABLISHING OBJECTIVES
PLANNING THE WORK
ORGANIZING FOR PRODUCTION
MOTIVATING PERSONNEL
CONTROLLING PERFORMANCE OF WORK
= SEQUENCE
= FEEDBACK

ELEMENTS OF TOTAL SYSTEMS


LARGER ENVIRONMENTAL SYSTEMS
INTERRELATED DECISIONAL SUBSYSTEMS
INTERRELATED INFORMATIONAL SUBSYSTEMS

THE PLANNING PROCESS

A. *Objective.* The objective of this section is to provide the learner with knowledge and skills in the concepts related to the planning process used in PPBS.

B. *Desired Outcomes.* If the general objective of this section has been achieved the learner should be able to:

1. Describe administrative roles necessary for planning and reporting.
2. Identify the basic stages in preparing program planning reports.
3. Construct a chart which indicates the sequence and administrative responsibility for the preparation of program planning reports.
4. Identify influencing factors impacting on total social and educational needs.
5. Identify needs from which goals and objectives can be determined.
6. Differentiate between intergovernmental and interdepartmental roles.

C. *Prerequisites.* Satisfactory completion of the objective in Section 1.

D. *Placement of Section in Sequence.* The learners should be aware that the concepts presented in Section 1 may be used independently. Consideration should also be given to alternate approaches to the topic. For example, in manpower planning or in development planning, economists have created models based on cross matrices of industry by occupation; labor and development economists should be consulted if such emphasis is desired.

E. *Pre-evaluation.* The learner may be asked to demonstrate achievement of "specific objectives" 1 through 7 of Section 2.

F. *Minimum Time Estimate.* Approximately one to three hours should be devoted to the presentation of the basic concepts included in this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. The Planning Process	57-59
2. Policy Base Topics	60

a. Influencing Factors	60
b. Total Needs	60
c. Roles	61, 62
3. Agency Organization	63
4. The PPBS Cycle	64-66
5. Preparation of Reports	67, 68

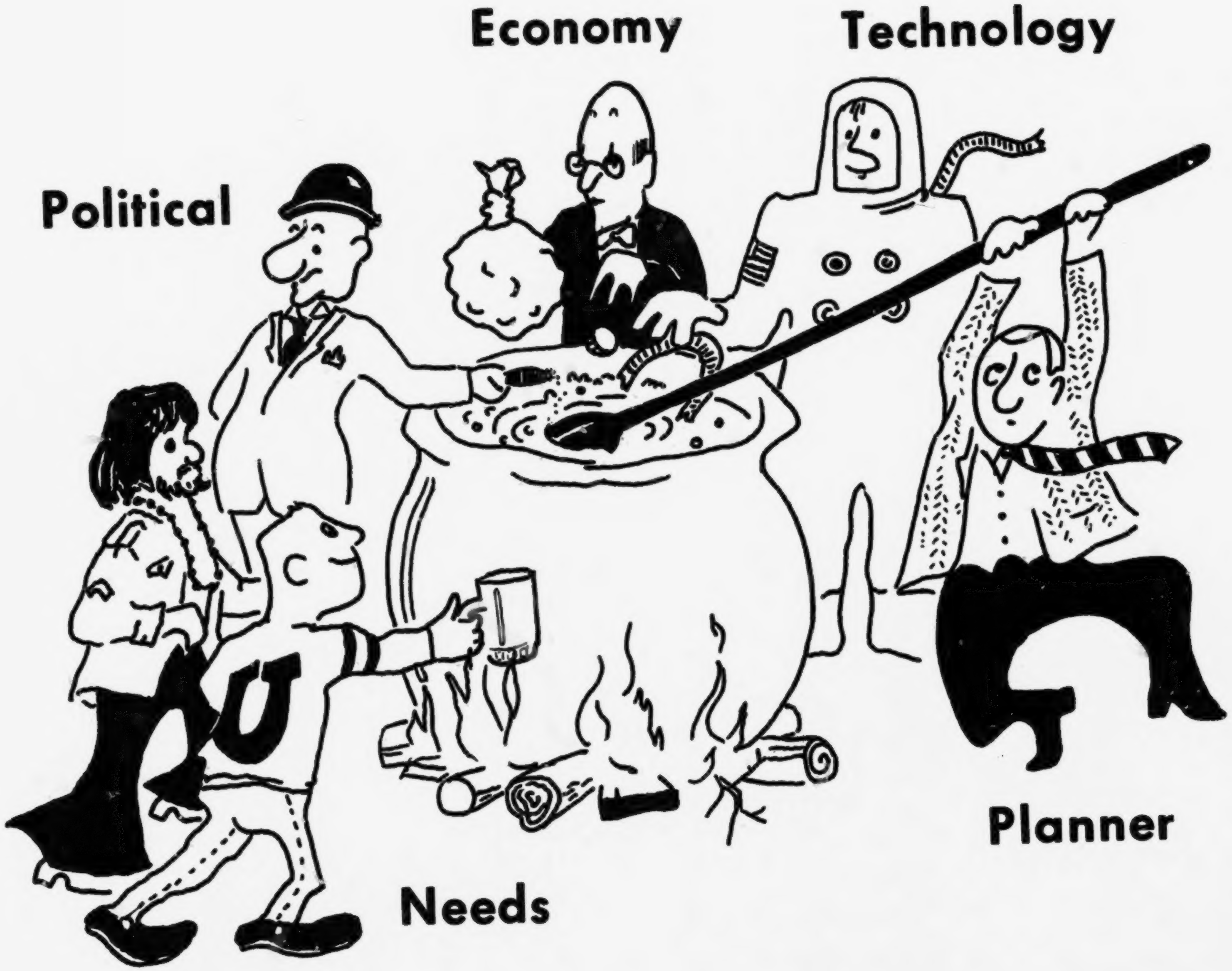
H. *Suggested Instructional Activities.*

1. The learners may, after the lecture-discussion period, be divided into small groups to create and present different plans for their respective political jurisdictions. The plans should focus on the establishment of quantifiable objectives and include estimates of the length of time required to implement the objective.
2. In-basket exercises may be developed from the basic guidelines for use with small seminar groups to achieve specific objectives one through four.
3. The learners may be asked to complete Step II, Manpower Needs, in *Volume II: A Case Problem.*

I. *Reference Material.* The following references may be used to develop and increase the learners' skills in this area:

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. R. N. Anthony, *Planning and Control Systems: A Framework for Analysis* (Boston: Graduate School of Business Administration, 1965).
4. G. B. March (ed.), *Occupational Data Requirements for Educational Planning* (Madison: University of Wisconsin, 1966).
5. State of New York, *Guidelines for Planning, Programming, Budgeting* (Albany: Executive Office, 1967 and 1968).

J. *Instructional Aids*--pages 57 through 68.


Economy
Technology
Political
Planner
Needs

The Planning Process

THE PLANNING PROCESS*

THE PURPOSE OF PLANNING IS TO PROVIDE A MECHANISM BY WHICH ALTERNATIVE GOALS, PROGRAMS, AND THEIR COSTS AND BENEFITS CAN BE ORGANIZED, ANALYZED AND SUMMARIZED. PLANNING INCLUDES:

1 DEVELOPMENT OF LONG-RANGE GOALS BY MAJOR FUNCTIONAL AREAS

2 PROJECTION OF BASIC POPULATION, ECONOMIC, SOCIAL AND PHYSICAL DATA

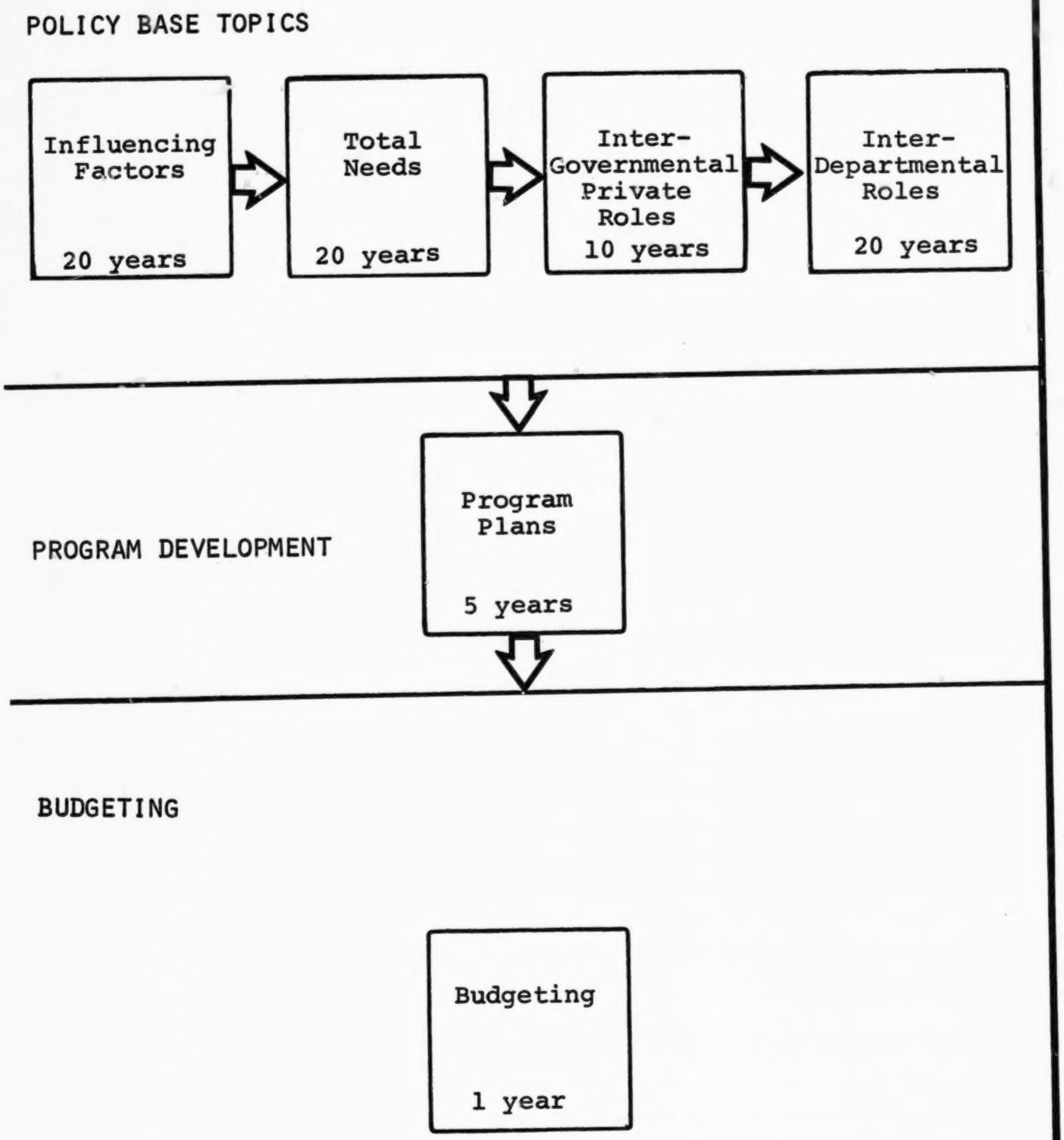
3 DEVELOPMENT AND MAINTENANCE OF A PROCESS WHEREBY PROGRAM ALTERNATIVES CAN EMERGE

4 DEVELOPMENT AND IMPROVEMENT OF METHODS FOR QUANTIFYING DATA ON GOALS, PROGRAMS AND RESOURCES ASSOCIATED THEREWITH

---

*THIS SECTION IS ADAPTED FROM NEW YORK STATE, *GUIDELINES FOR PLANNING PROGRAMMING BUDGETING, 1967*, EXECUTIVE OFFICE OF THE GOVERNOR, ALBANY.

PLANNING


POLICY BASE TOPICS
Influencing Factors
20 years
Total Needs
20 years
Inter-Governmental Private Roles
10 years
Inter-Departmental Roles
20 years
PROGRAM DEVELOPMENT
Program Plans
5 years
BUDGETING
Budgeting
1 year

POLICY BASE TOPICS

INFLUENCING FACTORS

THESE INCLUDE CHANGES IN POPULATION, THE DISTRIBUTION OF PERSONS BY NUMBER AND SPECIAL CHARACTERISTICS, CHANGES IN ECONOMIC ACTIVITY OR THE ECONOMIC WELL BEING OF PERSONS, SOCIAL TRENDS, SCIENTIFIC AND TECHNOLOGICAL CHANGE, AND OTHER MEANINGFUL LONG-TERM TRENDS. RELEVANT QUESTIONS FOR THIS TOPIC ARE:

1. IDENTIFY INFLUENCES THAT HAVE OR MIGHT HAVE EITHER A POSITIVE OR NEGATIVE EFFECT ON THE SUBSTANCE AND DIRECTION OF PROGRAMS IN THIS MAJOR PROGRAM AREA.
2. DESCRIBE THE MAGNITUDE OF THESE INFLUENCES.
3. PROJECT THE INFLUENCES OVER THE NEXT 20 YEARS.
4. IDENTIFY THE SOURCES OF ALL DATA AND DESCRIBE THE METHODOLOGY USED IN DETERMINING AND PROJECTING INFLUENCES.
5. INDICATE WHAT OTHER DATA, PROJECTIONS OR TREND ANALYSES WOULD BE HELPFUL IN IDENTIFYING INFLUENCES AND EVALUATING THEIR IMPACT ON PROGRAMS.

TOTAL NEEDS

ALL THOSE THINGS REQUIRED FOR CITIZENS' WELL BEING COMPRISING THE BROAD CONCERN OF A MAJOR PROGRAM AREA ARE IDENTIFIED BOTH IN TERMS OF QUALITY AND QUANTITY AND A SET OF MEANINGFUL INDICATORS IS SELECTED. THESE NEEDS ARE IDENTIFIED AND SELECTED WITHOUT REGARD TO THE RESPONSIBILITY OF ANY LEVEL OF GOVERNMENT OR OF PRIVATE INITIATIVE TO MEET THEM. RELEVANT QUESTIONS ARE:

1. DESCRIBE THE TYPES AND LEVELS OF NEEDS.
2. IDENTIFY THE QUANTIFIABLE INDICATORS OF NEEDS.
3. IDENTIFY THE PRIORITY RELATIONSHIPS AMONG THE NEEDS.
4. IDENTIFY THE IMPACT OF INFLUENCING FACTORS ON NEEDS.
5. PROJECT INDICATORS OF NEEDS, WITH EXPLANATION OF MAJOR FLUCTUATIONS.
6. DESCRIBE BRIEFLY: ASSUMPTIONS, CRITERIA, AND STANDARDS USED TO QUANTIFY, IDENTIFY AND PROJECT NEEDS.
7. INDICATE WHAT DATA RESOURCES ARE NECESSARY TO PERMIT BETTER MEASUREMENT AND EVALUATION OF NEEDS AND THEIR PRIORITIES.

POLICY BASE TOPICS

INTERGOVERNMENTAL AND PRIVATE ROLES

THE PURPOSE OF THIS TOPIC IS TO EVALUATE THE PRESENT AND FUTURE ROLES OF ALL LEVELS OF GOVERNMENT AND OF PRIVATE ENDEAVOR TOWARD THIS MAJOR PROGRAM AREA. THE DEFINITION OF RESPECTIVE RESPONSIBILITIES OF THE PRIVATE SECTOR AND THE VARIOUS LEVELS AND BRANCHES OF GOVERNMENT IS NECESSARY TO IDENTIFY EXISTING AND POTENTIAL AREAS OF COMPLEMENTARY ACTION OR CONFLICT. IN ORDER TO PROMOTE EFFECTIVE RELATIONSHIPS IT IS NECESSARY TO KNOW WHAT EXISTING ROLES ARE AND WHAT CHANGES MIGHT MAKE THEM MORE EFFECTIVE IN MEETING NEEDS. RELEVANT QUESTIONS ARE:

1 DESCRIBE THE PRESENT ROLES OF VARIOUS LEVELS OF GOVERNMENT (FEDERAL, STATE AND LOCAL) IN MEETING THE NEEDS OF THE MAJOR PROGRAM AREA.

2 DESCRIBE THE PRESENT ROLE OF THE PRIVATE SECTOR IN MEETING THE NEEDS OF THE MAJOR PROGRAM AREA.

3 EVALUATE THE SUCCESS OF THE FEDERAL AND LOCAL GOVERNMENTS, AND THE PRIVATE SECTOR, IN FULFILLING THEIR ROLE RESPONSIBILITIES.

4 EVALUATE THE IMPACT OF EXISTING, PROPOSED OR PROSPECTIVE FEDERAL LEGISLATION ON THE DIVISION OF RESPONSIBILITY IN THIS AREA.

5 DESCRIBE THE IMPACT OF FEDERAL ASSISTANCE PROGRAMS ON THE ROLE OF THE AGENCY IN THIS MAJOR PROGRAM AREA.

6 DESCRIBE FEDERAL GOVERNMENT ACTIVITIES WHICH IMPINGE UPON ROLES FORMERLY CONSIDERED STATE OR LOCAL RESPONSIBILITIES.

7 IDENTIFY ANY NEEDS THAT MIGHT BETTER BE SERVED BY STATE GOVERNMENT ASSUMPTION OF RESPONSIBILITIES IT DOES NOT NOW HOLD AND DESCRIBE HOW IT COULD FULFILL THEM.

8 IDENTIFY HOW OTHER GOVERNMENTAL LEVELS OR THE PRIVATE SECTOR MIGHT BETTER SERVE NEEDS BY ASSUMPTION OF RESPONSIBILITIES THEY DO NOT NOW EXERCISE.

9 DESCRIBE ACTIONS TAKEN BY THE AGENCY TO ENCOURAGE EFFECTIVE INTERGOVERNMENTAL AND PRIVATE RELATIONSHIPS.

10 PROJECT THE FUTURE ROLES OF ALL LEVELS OF GOVERNMENT AND OF PRIVATE ENDEAVOR IN MEETING THE TOTAL NEEDS OF THIS MAJOR PROGRAM AREA.

POLICY BASE TOPICS

INTERDEPARTMENTAL ROLES

USING THE STATE GOVERNMENT ROLES DEFINED AS PART OF TOPIC III AS A BASE, THE ACTIVITIES OF THE AGENCY WHICH ARE RELATED TO OTHER AGENCIES OF STATE GOVERNMENT ARE IDENTIFIED IN THIS TOPIC. IT IS ESSENTIAL THAT THE KIND AND EXTENT OF ACTIVITIES BE IDENTIFIED FOR EACH AGENCY WHICH AFFECTS THE MAJOR PROGRAM AREA. EFFORTS AT INTERDEPARTMENTAL COORDINATION AND COOPERATION ARE TO BE SPECIFIED IN ORDER TO PERMIT OVERALL ANALYSIS OF THE EFFECTIVENESS OF STATE ACTIVITY. RELEVANT QUESTIONS INCLUDE:

1 DESCRIBE THE RESPONSIBILITY OF THE AGENCY IN MEETING THE NEEDS OF THE MAJOR PROGRAM AREA.

2 DESCRIBE THE STATUTORY AND OTHER COORDINATING MECHANISMS WHICH AFFECT THE MAJOR PROGRAM AREA.

3 DESCRIBE THE ROLES OF OTHER STATE AGENCIES WHICH AFFECT THE MAJOR PROGRAM AREA.

4 IDENTIFY ANY SIGNIFICANT OVERLAP OF RESPONSIBILITY AND INDICATE IN WHAT WAY THE OVERLAP MIGHT BEST BE ELIMINATED.

5 IDENTIFY ANY SIGNIFICANT GAPS IN RESPONSIBILITY AND INDICATE IN WHAT WAY THESE GAPS OUGHT TO BE ELIMINATED.

6 DISCUSS WAYS IN WHICH INTERDEPARTMENTAL COORDINATION MIGHT BE IMPROVED.

AGENCY ORGANIZATION FOR PLANNING AND REPORTING

ORGANIZING FOR PLANNING

TOP LEVEL EXECUTIVE COMMITMENT TO THE PLANNING PROCESS IN EACH AGENCY IS ESSENTIAL

AN EXECUTIVE STAFF MEMBER SHOULD BE DESIGNATED AS PROGRAM PLANNING COORDINATOR

PROGRAM ADMINISTRATORS SHOULD BE INVOLVED IN THE PLANNING PROCESS, AND SHOULD PARTICIPATE IN THE EVALUATION AND DEVELOPMENT OF EXISTING AND PROPOSED PROGRAM PLANS

PROGRAM PLANNING SHOULD BE ESTABLISHED AS A CONTINUING AGENCY RESPONSIBILITY AND OPERATING PERSONNEL SHOULD RECEIVE TRAINING IN PLANNING TECHNIQUES AND STRATEGIES

SUFFICIENT STAFF PERSONNEL SHOULD BE ASSIGNED AND GIVEN SUFFICIENT TIME TO CONDUCT NECESSARY RESEARCH, ASSEMBLE DATA AND PREPARE PLANNING REPORTS IN ACCORD WITH THE ESTABLISHED ANNUAL CYCLE

BASIC STAGES IN PREPARING PLANNING REPORTS

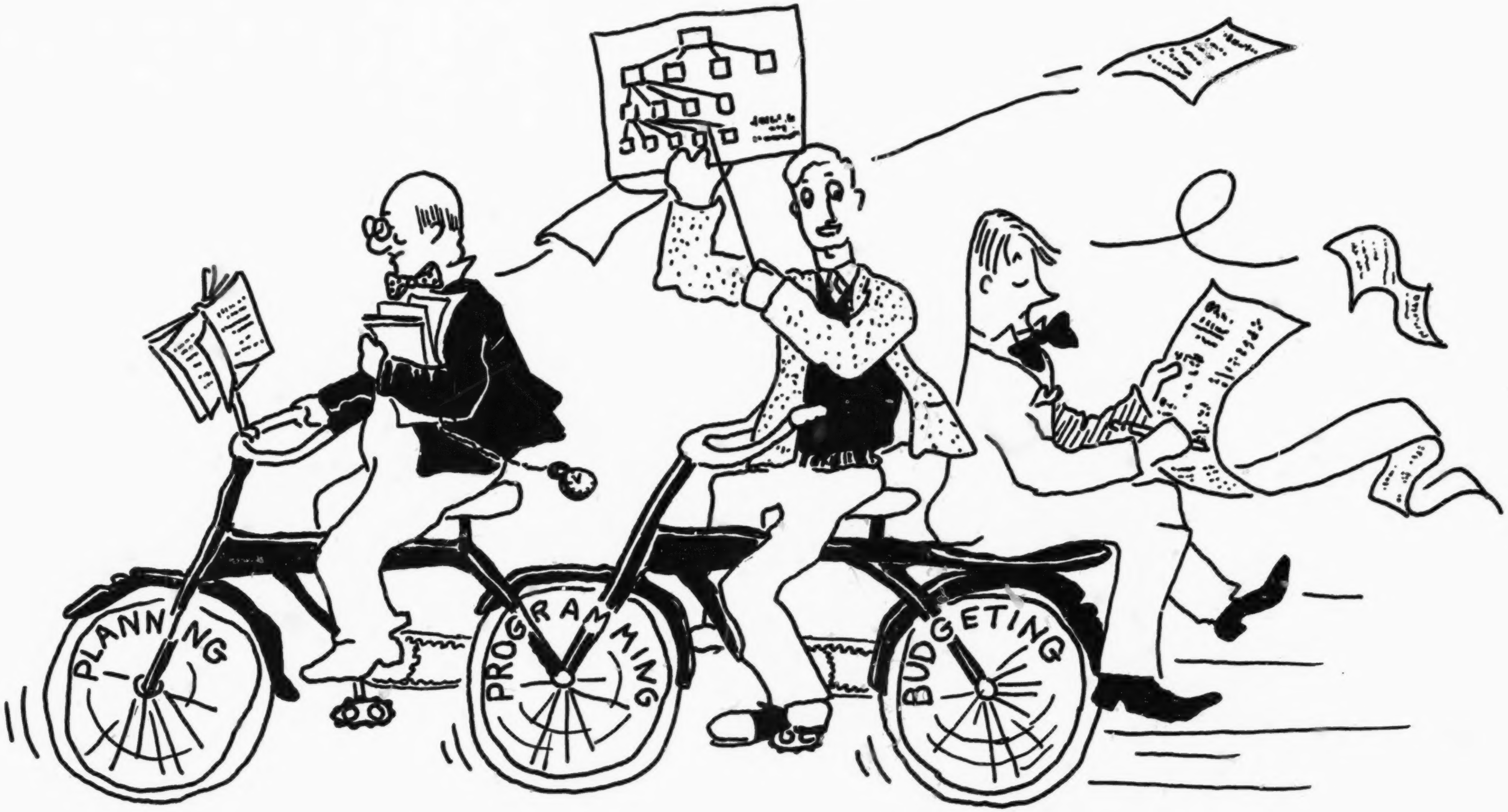
THE AGENCY'S EXECUTIVE STAFF PREPARES A TENTATIVE STATEMENT OF LONG-RANGE GOALS FOR ITS MAJOR PROGRAM AREAS AND A SCHEDULE FOR REPORTS PREPARATION

BASED ON THE TENTATIVE GOALS, PRELIMINARY PRIORITIES ARE GIVEN TO PROGRAM ADMINISTRATORS IN DEVELOPING PROPOSED PROGRAM PLANS TO FULFILL THESE GOALS AND ACCOMPANYING PROGRAM ACHIEVEMENT SCHEDULES AND ESTIMATES OF MANPOWER, MONEY AND MATERIALS REQUIRED TO SUPPORT THE PROGRAM PLANS

PROGRAM ADMINISTRATORS EXAMINE THE GOAL PRIORITIES AND ASSEMBLE DATA SUPPORTING EITHER RETENTION OR REVISION OF THE TENTATIVE PRIORITIES

TENTATIVE PROGRAM PLANS AND RESOURCE REQUIREMENTS ARE DEVELOPED IN SUPPORT OF THE PRIORITIES INDICATED BY AN EXAMINATION OF THE ASSEMBLED DATA

THE EXECUTIVE STAFF REVIEWS THE TENTATIVE PROGRAM PLANS AND RESOURCE REQUIREMENTS AND SETS FINAL PRIORITIES


PLANNING
PROGRAMMING
BUDGETING

Planning-Programming-Budgeting Cycle

THE SIX PHASES OF THE ANNUAL PLANNING CYCLE

ORGANIZATION PHASE

SOME CENTRAL AUTHORITY (THE GOVERNOR, CENTRAL BUDGETING AGENCY, STATE SUPERINTENDENT) ESTABLISHES THE CYCLE AND PREPARES BASELINE POPULATION AND ECONOMIC TRENDS FOR SUBORDINATE UNITS

AGENCY REPORT PREPARATION

THE AGENCY PREPARES ITS GOAL STATEMENT AND PROGRAM PLAN REPORT BEFORE THE START OF THE FISCAL YEAR BUT PROVIDES FOR ADJUSTMENTS TO INSURE THAT LEGISLATIVE CHANGES IN ITS CURRENT BUDGET ARE REFLECTED IN THE PROGRAM PLANNING REPORTS

POLICY CONFERENCES WITH CENTRAL AUTHORITIES

7-9 MONTHS BEFORE THE START OF THE NEW FISCAL YEAR CONFERENCES ARE SCHEDULED WITH THE CENTRAL AUTHORITIES TO DISCUSS MAJOR POLICY ISSUES AND ADMINISTRATIVE ASPECTS OF THE REPORTS. A GENERAL ANALYSIS AND EVALUATION OF THE MAJOR TRENDS OF PROGRAMS IS PREPARED FOR THE USE OF THE CENTRAL AUTHORITY (GOVERNOR) BY THE CENTRAL PLANNING AND BUDGET PERSONNEL

PROGRAM COORDINATION AND SUMMARIZATION

FOLLOWUP WORK ON EXISTING OR POTENTIAL POLICY ISSUES AND ADMINISTRATIVE PROBLEMS, PLANNING, AND BUDGETARY IMPLICATIONS OF THE PROGRAM PLANS, IS UNDERTAKEN BY THE CENTRAL PLANNING AND BUDGETARY STAFF TO THE CENTRAL AUTHORITY (GOVERNOR); MEETINGS ARE HELD WITH AGENCIES TO CLARIFY POLICY ISSUES AND PROBLEM AREAS PRIOR TO SUBMISSION OF THEIR BUDGET REQUESTS

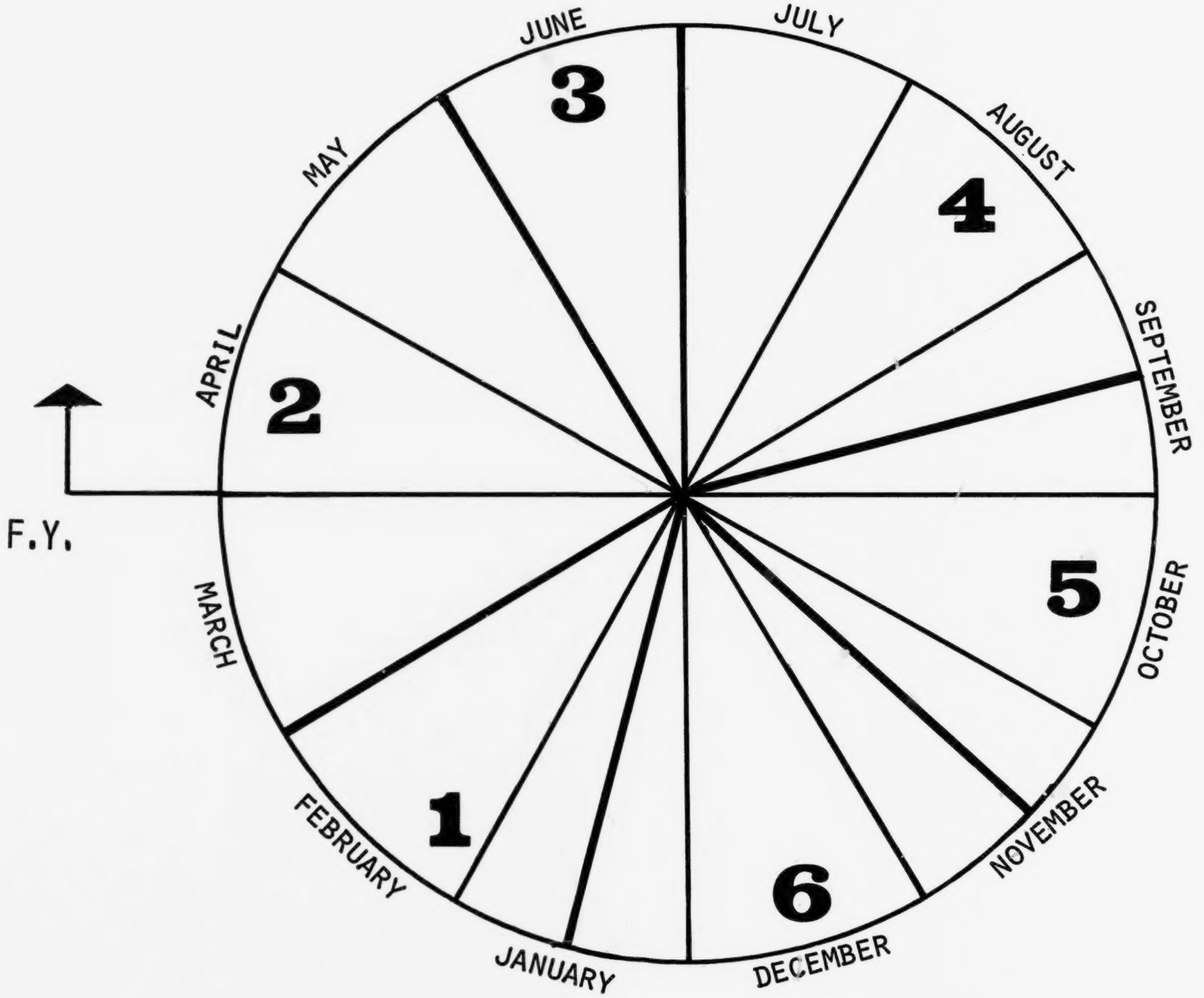
PROGRAM PLANS AND BUDGETS INTEGRATED

THE AGENCY BUDGET REQUESTS ARE PRESENTED IN THE CONTEXT OF THEIR PROGRAM GOALS DURING THEIR FORMAL BUDGET HEARINGS 3-6 MONTHS BEFORE THE GOVERNOR'S BUDGET IS SUBMITTED TO THE LEGISLATURE

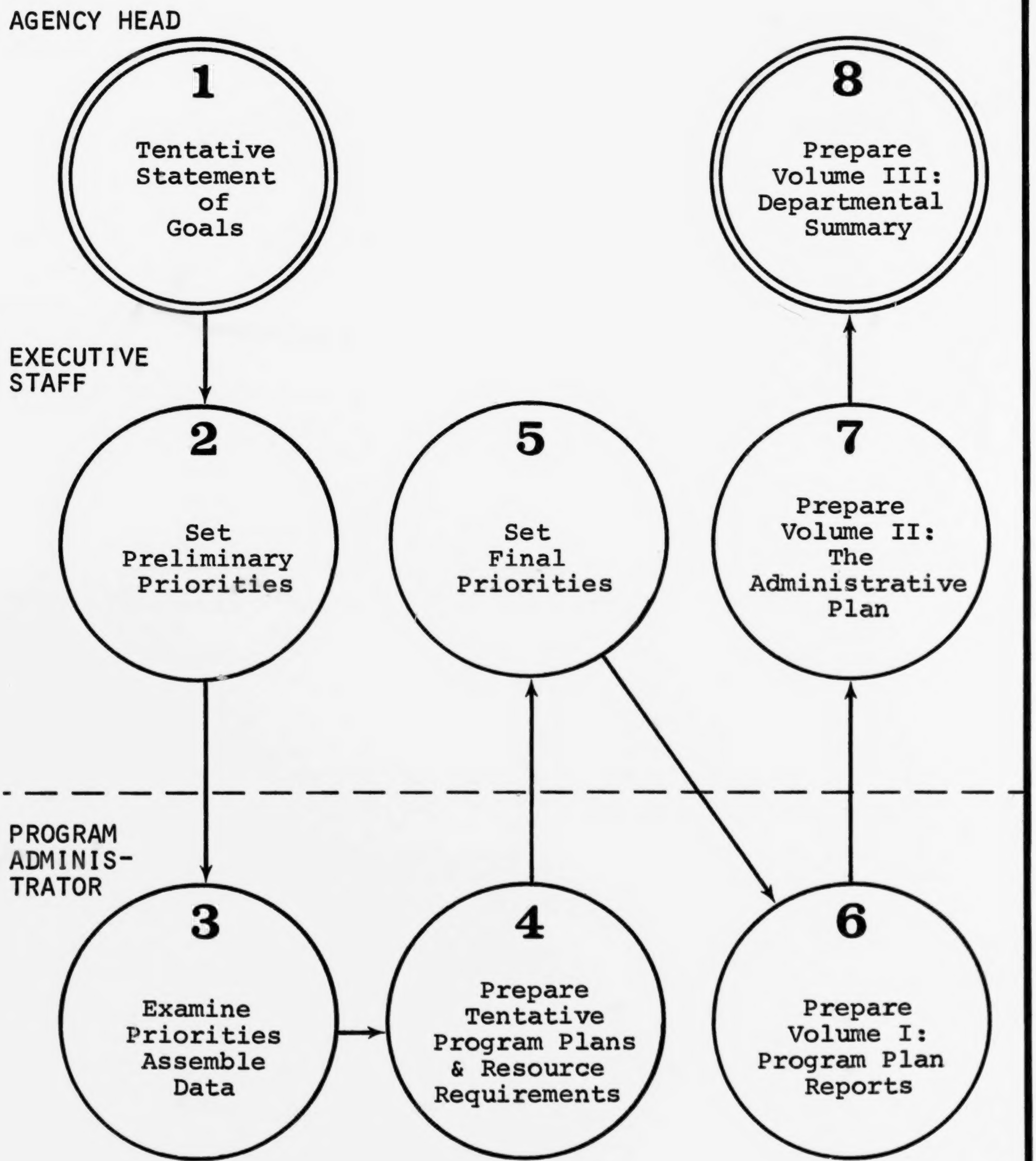
THE GOVERNOR'S BUDGET

THE GOVERNOR'S BUDGET IS DEVELOPED IN ACCORDANCE WITH THE COORDINATED PROGRAM PLANS AND PRIORITIES RELATED AND ASSIGNED TO THEM

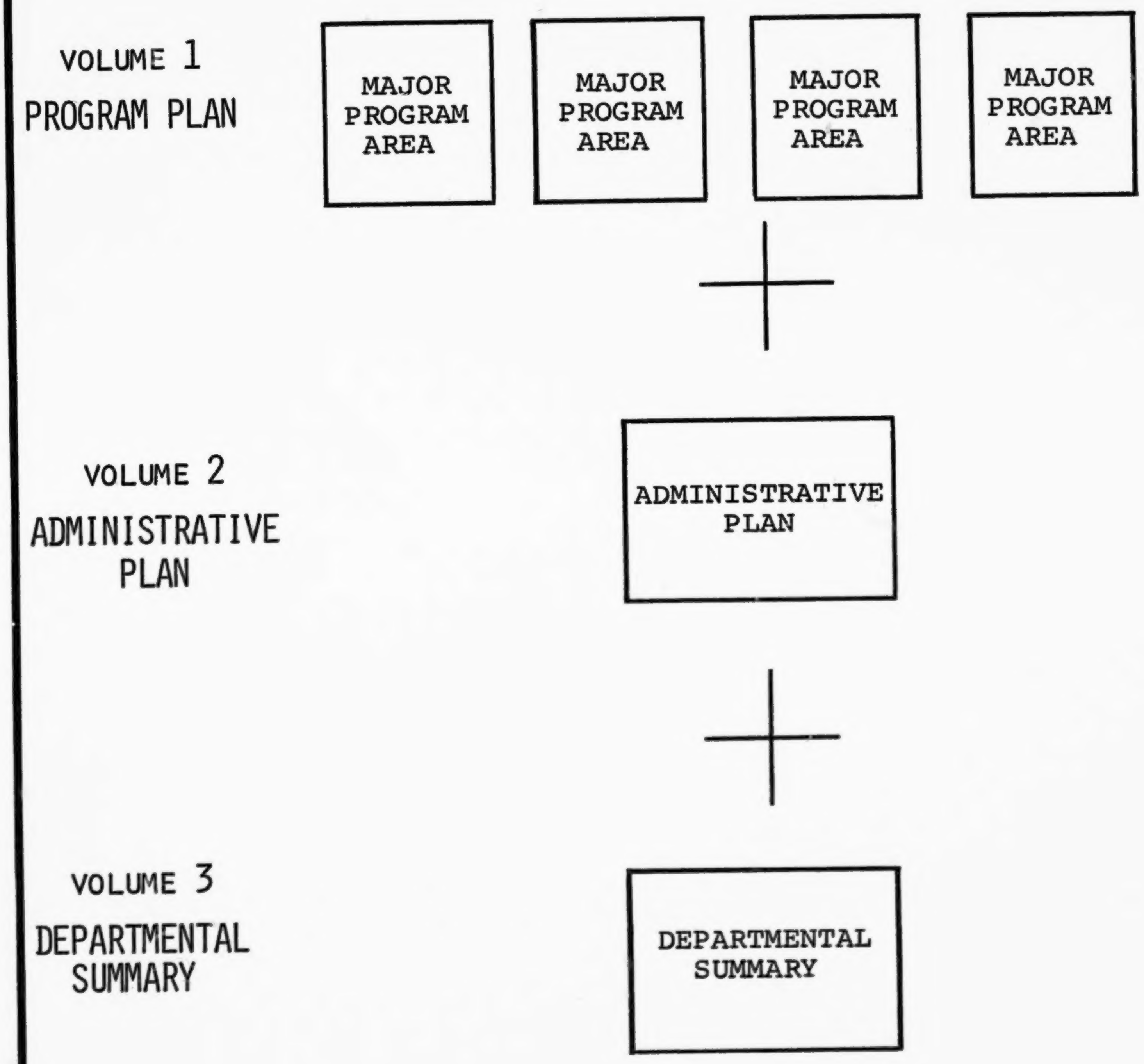
PLANNING-PROGRAMMING-BUDGETING CYCLE


JUNE
JULY
MAY
AUGUST
APRIL
SEPTEMBER
MARCH
OCTOBER
FEBRUARY
NOVEMBER
JANUARY
DECEMBER
1
2
3
4
5
6
F.Y.

BASIC STAGES IN PREPARING PROGRAM PLANNING REPORTS


AGENCY HEAD
1
Tentative Statement of Goals
8
Prepare Volume III: Departmental Summary
EXECUTIVE STAFF
2
Set Preliminary Priorities
5
Set Final Priorities
7
Prepare Volume II: The Administrative Plan
PROGRAM ADMINISTRATOR
3
Examine Priorities Assemble Data
4
Prepare Tentative Program Plans & Resource Requirements
6
Prepare Volume I: Program Plan Reports

REPORTS REQUESTED


VOLUME 1
PROGRAM PLAN
MAJOR PROGRAM AREA
MAJOR PROGRAM AREA
MAJOR PROGRAM AREA
MAJOR PROGRAM AREA
VOLUME 2
ADMINISTRATIVE PLAN
ADMINISTRATIVE PLAN
VOLUME 3
DEPARTMENTAL SUMMARY
DEPARTMENTAL SUMMARY

SECTION 4

INVESTMENT ALTERNATIVES

A. *Objective.* The objective of this section is to provide the learner with knowledge related to the formulation of objectives and alternative activities and the identification of the benefits and costs of education.

B. *Desired Outcomes.* If the general objective of this section has been achieved, the learner should be able to:

1. Differentiate between goals and objectives.
2. Identify objectives that are quantitatively measurable.
3. Differentiate between political and legal sources of objectives.
4. Differentiate between the consumption and investment function of education.
5. Identify the direct and indirect costs of receiving an education.
6. Differentiate between current operating costs and capital expenditures.

C. *Prerequisites.* Satisfactory achievement of the objectives outlined in Section 1. It is also desirable for the learner to achieve the objectives of Sections 2 and 3.

D. *Placement of Section in Sequence.* This section may be used independently. It is recommended that at least Section 1 precede this section.

E. *Pre-evaluation.* The learner may be asked to demonstrate achievement of specific objectives of Sections 1 and 3.

F. *Minimum Time Estimate.* Approximately two to four hours should be devoted to the lecture-discussion of the basic concepts presented in this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Consideration of Investment Alternatives	
a. Process Model	71
b. Elements	72

2. Objectives
   a. Characteristics 72
   b. Identification 73-75
3. Alternative Activities 76
4. Benefits of Education 77
   a. Nonproductive 78
   b. Productive 79
5. Costs of Education
   a. To the Individual 80
   b. To the Organization 80

H. *Suggested Instructional Activities.*

1. The learners may be asked to seek alternatives to the objectives established in Section 3.
2. The learners may be asked to critically analyze a set of educational objectives.
3. The learners may be asked to begin work on Step III and IV, Program Structure, in *Volume II: A Case Problem.*
4. A lecture presenting the general objective of this section may precede small group instruction.
5. Small group or individual instruction may be conducted through problem-solving packets developed from the basic guidelines.

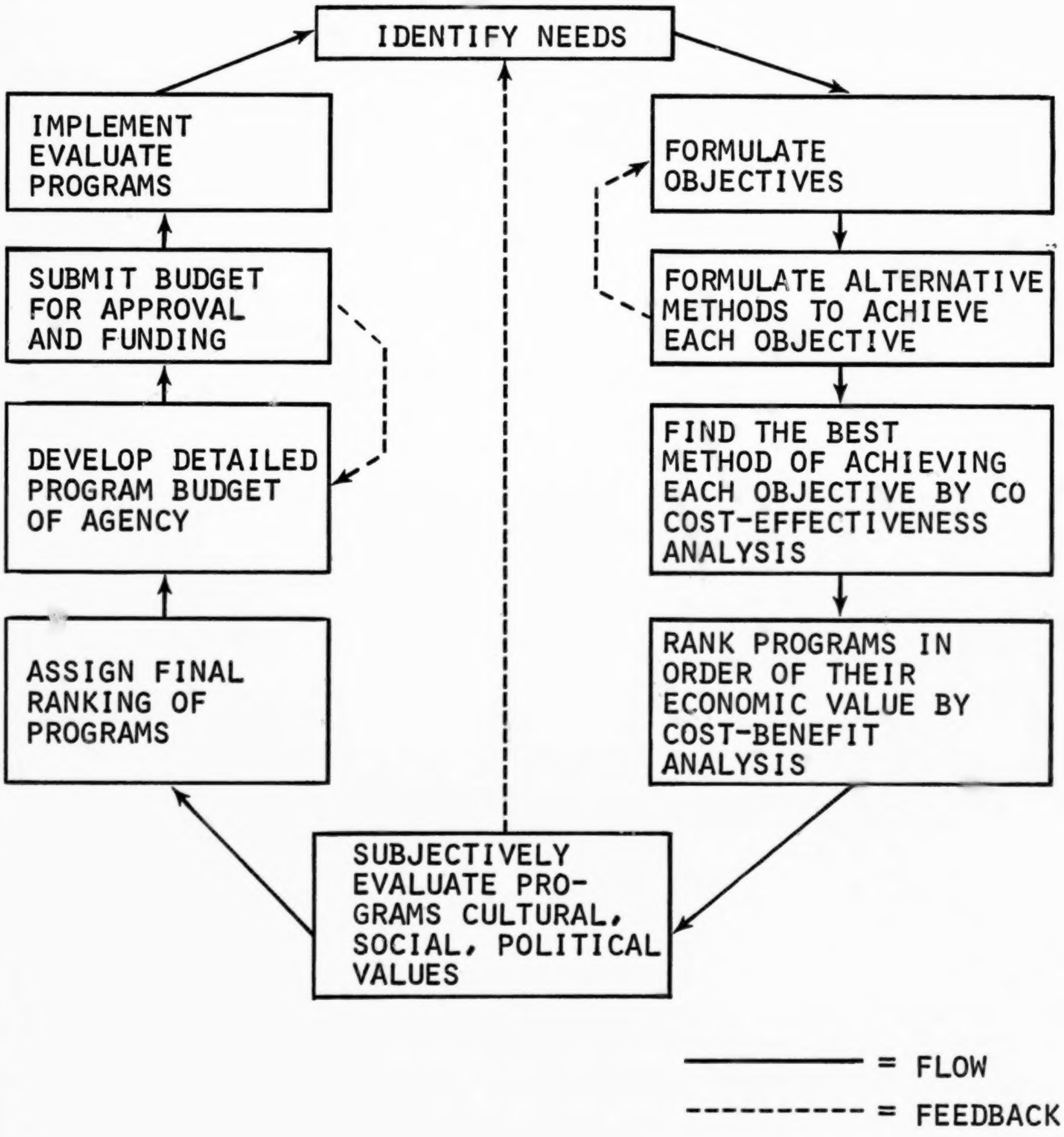
I. *Reference Material.*

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. Robert F. Mager, *Preparing Instructional Objectives* (Palo Alto, California: Fearon Publishers, 1962).
4. George Odiorne, *Management by Objectives* (New York: Pitmon and Sons, 1966).
5. J. Robert Warmbrod, *Review and Synthesis of Research on the Economics of Vocational-Technical Education* (Columbus: The Center for Vocational and Technical Education, 1968).

J. *Instructional Aids*--pages 71 through 80.

CONSIDERATION OF INVESTMENT ALTERNATIVES

GENERAL PROCEDURE


IDENTIFY NEEDS
FORMULATE OBJECTIVES
FORMULATE ALTERNATIVE METHODS TO ACHIEVE EACH OBJECTIVE
FIND THE BEST METHOD OF ACHIEVING EACH OBJECTIVE BY CO COST-EFFECTIVENESS ANALYSIS
RANK PROGRAMS IN ORDER OF THEIR ECONOMIC VALUE BY COST-BENEFIT ANALYSIS
SUBJECTIVELY EVALUATE PROGRAMS CULTURAL, SOCIAL, POLITICAL VALUES
ASSIGN FINAL RANKING OF PROGRAMS
DEVELOP DETAILED PROGRAM BUDGET OF AGENCY
SUBMIT BUDGET FOR APPROVAL AND FUNDING
IMPLEMENT EVALUATE PROGRAMS
= FLOW
= FEEDBACK

CONSIDERATION OF INVESTMENT ALTERNATIVES

NECESSARY ELEMENTS:

1. OBJECTIVES
2. ALTERNATIVE MEANS
3. MEASURABLE BENEFITS
4. MEASURABLE COSTS

THE KEY TO ANY SOUND ANALYSIS OF ALTERNATIVES LIES IN THE SPECIFICATION OF AN OBJECTIVE OR SET OF OBJECTIVES.

OBJECTIVES

CHARACTERISTICS OF "GOOD" OBJECTIVES

1. EXPLICIT
2. SPECIFIC
3. REFLECT ACTUAL GOALS OF SOCIETY
4. STATE PRIORITIES IN MULTIPLE GOAL STATEMENTS
5. ORGANIZED INTO RELATED CLASSES
6. QUANTITATIVELY MEASUREABLE

EXAMPLES OF "GOOD" OBJECTIVES

1. TO TRAIN 10% OF THE UNEMPLOYED LABOR FORCE PER YEAR AND PLACE THEM IN JOBS
2. TO TRAIN 5,000 STUDENTS PER YEAR AS EMPLOYABLE NURSE'S AIDS
3. TO ENABLE THE STUDENT SEEKING AN ENTRY LEVEL STENOGRAPHER JOB TO REACH A TRANSCRIBING PROFICIENCY OF 80-120 WORDS PER MINUTE
4. TO INCREASE THE NUMBER OF ELECTRONICS TECHNICIANS TRAINED BY 15% PER YEAR

IDENTIFICATION OF OBJECTIVES

LEGALLY AUTHORITATIVE SOURCES

1 LAW AND STATUTES

2 STATE AND AGENCY PLANS

3 STATEMENTS OF CONTROLLING BODIES SUCH AS LEGISLATURE, EXECUTIVE, AND BOARDS

POLITICALLY AUTHORITATIVE SOURCES

1 SPECIAL INTEREST GROUPS

2 ADVISORY BOARDS

3 PERSONAL OPINIONS

PROGRAM SUBSTANCE AND ACTIVITIES

1 BEHAVIOR OF PERSONNEL, ADMINISTRATION, TEACHERS, AND STUDENTS

2 CONTENT OF PROGRAM-TEACHING MATERIALS

3 PRESENT MEASUREMENT INSTRUMENTS--TESTS AND REQUIREMENTS

PROGRAM OUTPUT--QUANTITY AND QUALITY

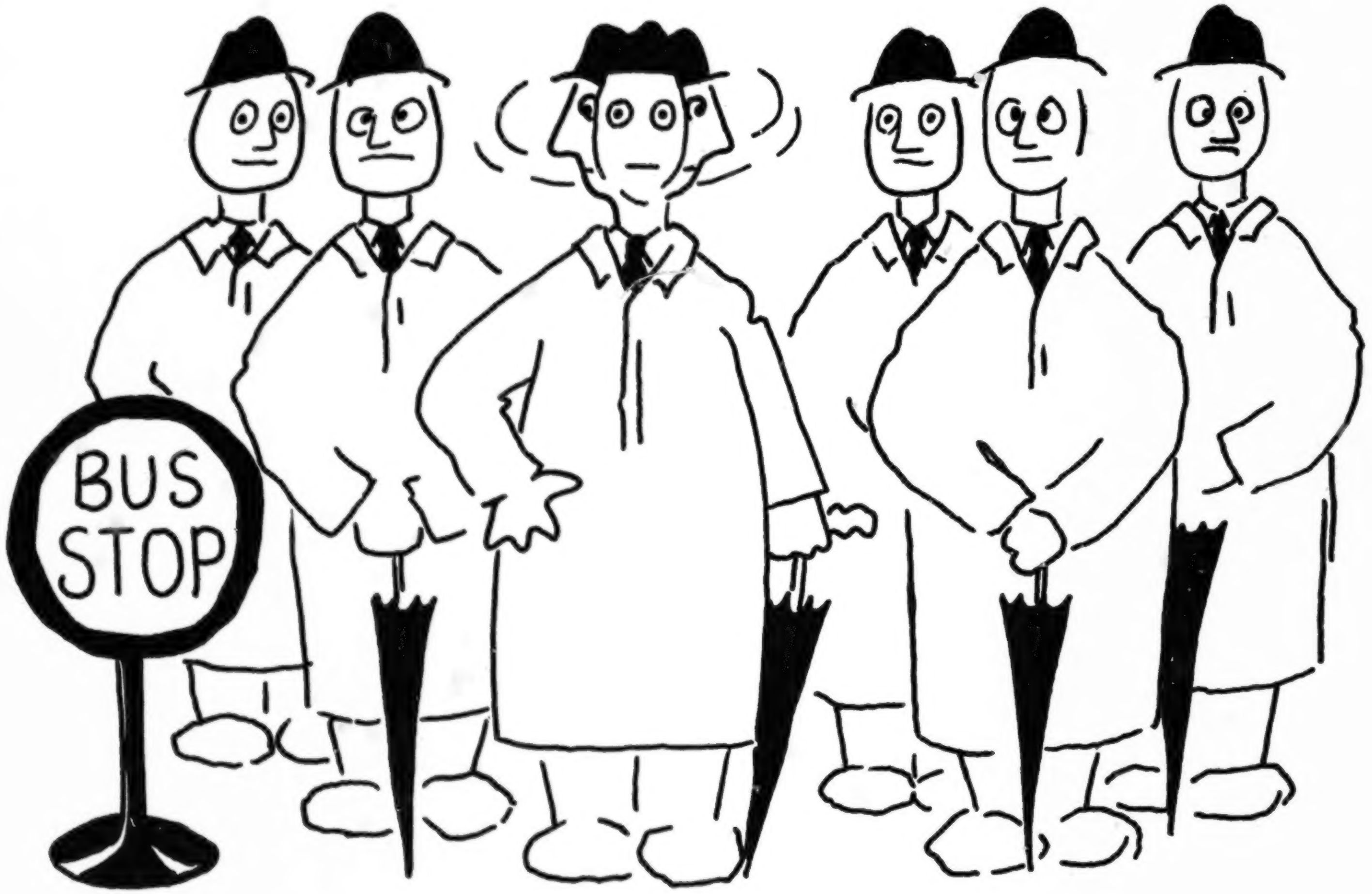
1 GRADUATES

2 EMPLOYABLE GRADUATES

3 EMPLOYED GRADUATES

4 COLLEGE STUDENTS

5 DROP OUTS



Problems of Identification

PROBLEMS OF IDENTIFICATION

MULTIPLE GOALS

1 INTELLECTUAL--ACADEMIC
2 PRACTICAL--VOCATIONAL
3 PERSONAL--INDIVIDUAL
4 MORAL--ETHICAL

CONFLICT OF GOALS

1 QUANTITY VERSUS QUALITY
2 INTELLECTUAL VERSUS PRACTICAL

PRIORITY AMONG GOALS

1 PRIMARY GOAL
2 SECONDARY GOALS
3 BY-PRODUCTS

RESPONSIBILITY FOR IMPLEMENTATION

1 MULTIPLE AGENCIES WITHIN A GOVERNMENT JURISDICTION
2 MULTIPLE AGENCIES BETWEEN GOVERNMENT JURISDICTIONS

MEASURABLE VERSUS UNMEASURABLE GOALS

1 RELATIVE IMPORTANCE
2 EXPLICIT IDENTIFICATION OF UNMEASURABLE GOALS

NO DISCERNABLE OBJECTIVE CAN BE FOUND

ALTERNATIVE MEANS

WHO?

PUBLIC ACTIVITIES ONLY

1. LOCAL
2. STATE
3. FEDERAL

MIXED ACTIVITIES

1. SUBSIDIZE PRIVATE
2. SEPARATE PUBLIC AND PRIVATE

PRIVATE ACTIVITIES ONLY

DOES WHAT?

ACADEMIC EDUCATION ONLY
VOCATIONAL AND ACADEMIC EDUCATION
VOCATIONAL EDUCATION ONLY

1. OCCUPATIONAL AREAS
2. COURSES WITHIN OCCUPATIONAL AREAS

FOR WHOM?

EVERYONE
UNEMPLOYED
AGE LEVEL GROUPS
HANDICAPPED
OTHERS

HOW?

PRIMARY SCHOOLS
SECONDARY SCHOOLS

1. COMPREHENSIVE
2. VOCATIONAL

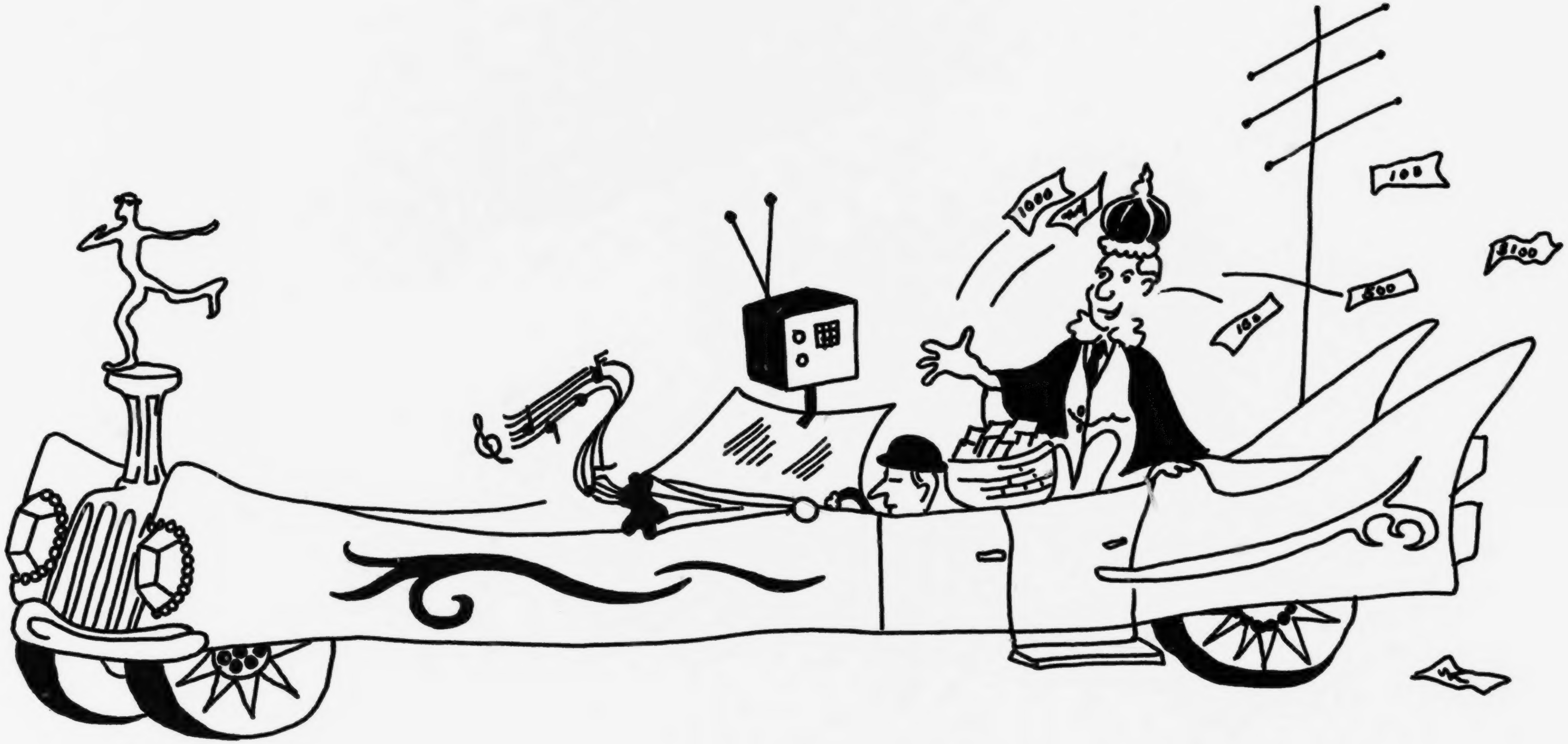
POST-SECONDARY SCHOOLS

1. COMPREHENSIVE
2. VOCATIONAL

APPRENTICESHIPS

HOW MUCH?

TOTAL NEED FULFILLMENT
A PROPORTION OF TOTAL
NONE


1000
100
100
$500
$100

The Benefits of Education

THE BENEFITS OF EDUCATION

NONPRODUCTIVE BENEFITS

DIRECT: TO THE INDIVIDUAL

1 SATISFACTION OF "THE THIRST FOR KNOWLEDGE"

2 APPRECIATION OF LITERATURE, MUSIC, CULTURE, ETC.

3 MENTAL HEALTH

4 WORKING CONDITIONS OF OCCUPATION

5 STATUS OF OCCUPATION

INDIRECT: TO SOCIETY

1 REDISTRIBUTION OF INCOME

2 EQUALITY

--CULTURAL

--POLITICAL

3 STABILITY

--POLITICAL

--SOCIAL

THE BENEFITS OF EDUCATION

PRODUCTIVE BENEFITS

DIRECT: TO THE INDIVIDUAL

1 WAGE LEVELS

2 PERCENT OF TIME EMPLOYED

3 VACATION, SICK LEAVE, AND RETIREMENT BENEFITS

4 PROBABILITY OF FURTHER EDUCATION, FORMAL AND INFORMAL

INDIRECT: TO SOCIETY

1 TAX REVENUES

2 REDUCTION OF GOVERNMENT EXPENDITURES FOR:

  --CRIME PREVENTION AND APPREHENSION

  --WELFARE

  --UNEMPLOYMENT INSURANCE

3 AGGREGATE LEVEL OF EMPLOYMENT

4 REDUCTION OF PARENTAL SUPERVISION TIME

5 PRODUCTIVITY OF FELLOW WORKERS

6 AGGREGATE LEVEL OF ECONOMIC ACTIVITY

7 TRANSMISSION OF KNOWLEDGE TO CHILDREN

8 DIRECT COSTS OF CRIME TO SOCIETY

THE COSTS OF EDUCATION

COSTS OF RECEIVING EDUCATION

1 ADDITIONAL COSTS
    - --LODGING
    - --FOOD
    - --CLOTHING
    - --TUITION
    - --BOOKS
    - --TRANSPORTATION

2 OPPORTUNITY COSTS OF FOREGONE ALTERNATIVES
    - --FOREGONE INCOME
    - --FOREGONE EDUCATION

COSTS OF SUPPLYING EDUCATION

1 CURRENT OPERATING COSTS
    - --PERSONNEL
    - --EQUIPMENT OPERATION AND MAINTENANCE

2 CAPITAL EXPENDITURES
    - --INITIAL COSTS OF BUILDINGS AND SITES
    - --INITIAL COSTS OF EQUIPMENT
    - --DEPRECIATION

3 COST CORRECTION FACTORS
    - --PROPERTY TAXES
    - --SALES TAXES
    - --EXCISE TAXES

SECTION 5

PROGRAM BUDGETING

A. *Objective.* The objective of this section is to provide the learner with information and skills in concepts related to program budgeting.

B. *Desired Outcomes.* If the general objective of this section has been achieved, the learner should be able to:

1. Differentiate between objectives and long-term goals.
2. Identify the elements of a program budget.
3. Define the relationship which exists between program structure and outputs of the agency.
4. Identify the major steps to be taken in developing a program structure.

C. *Prerequisite.* Satisfactory completion of the objectives outlined in Sections 1, 3, and 4.

D. *Placement of Section in Sequence.* This section should precede Sections 6 and 7 which deal with the internal organizational aspects of "program." When independent use is possible, it is recommended that Sections 1, 3, and 4 precede the presentation of this section.

E. *Pre-evaluation.* The learner may be asked to demonstrate successful achievement in the specific objectives of Sections 1, 2, and 4 before being introduced to this section.

F. *Minimum Time Estimate.* Approximately one to three hours should be devoted to learning activity designed to reach a satisfactory level of performance for this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Program Budgeting	83, 84
2. Anatomy of a Program Budget	85, 86
3. Structure of a Program Budget	87, 88
a. Alternatives	89-91
b. Development	92-94

4. Data Needs 95, 96
5. Time Period 96, 97
6. Summary 98

H. *Suggested Instructional Activities.*

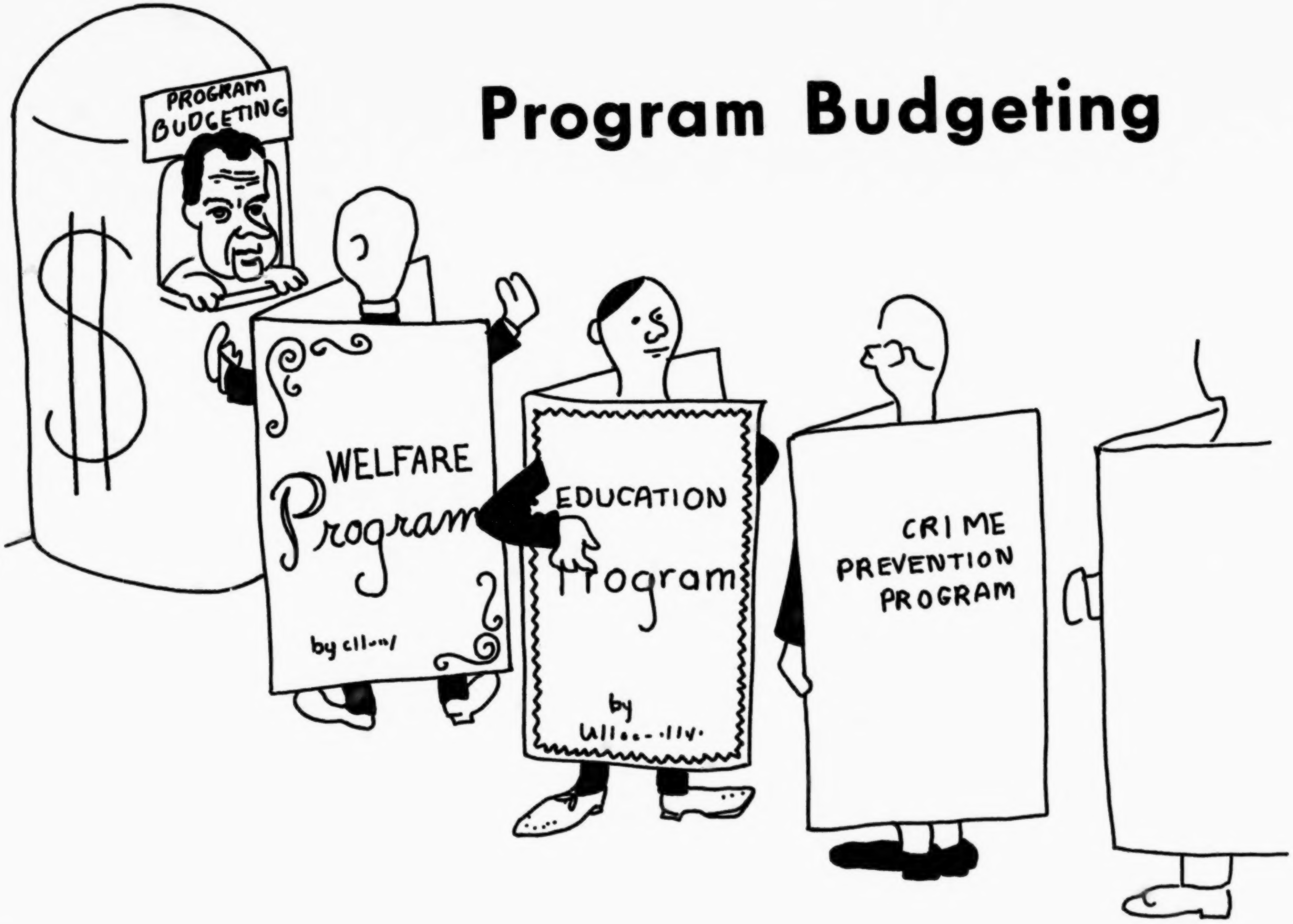
1. Discussion in large or small groups may be utilized in order to clarify the general objectives.
2. The learners may receive problem statements developed from the guidelines. Problem solving work in dyads may then be used to achieve the specific objectives of this section.
3. For the lecture presentation the learner may be presented with an account of the implementation steps of program budgeting in a given political jurisdiction.
4. The learners may be asked to complete Step III and IV, Program Structure and Achievement of Objectives, in *Volume II: A Case Problem.*

I. *Reference Material.*

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. G. H. Fisher, *The World of Program Budgeting* (Santa Monica: The Rand Corporation, 1966).
4. Werner Z. Hirsch, *Toward Federal Program Budgeting* (Santa Monica: The Rand Corporation, 1966).
5. State of Wisconsin, *A Prospective Integrated Planning-Budgeting System for Wisconsin State Government* (Madison, Wisconsin: State Department of Administration, 1967).
6. Jesse Burkhead, "The Theory and Application of Program Budgeting to Education" in *Trends in Financing Public Education*, Eighth National Conference on School Finance (Washington, D. C.: National Education Association Committee on Educational Finance, 1965).

J. *Instructional Aids*--pages 83 through 98.

Program Budgeting


PROGRAM BUDGETING
WELFARE Program
by cll--l
EDUCATION Program
by Ulle---llv.
CRIME PREVENTION PROGRAM

PROGRAM BUDGETING

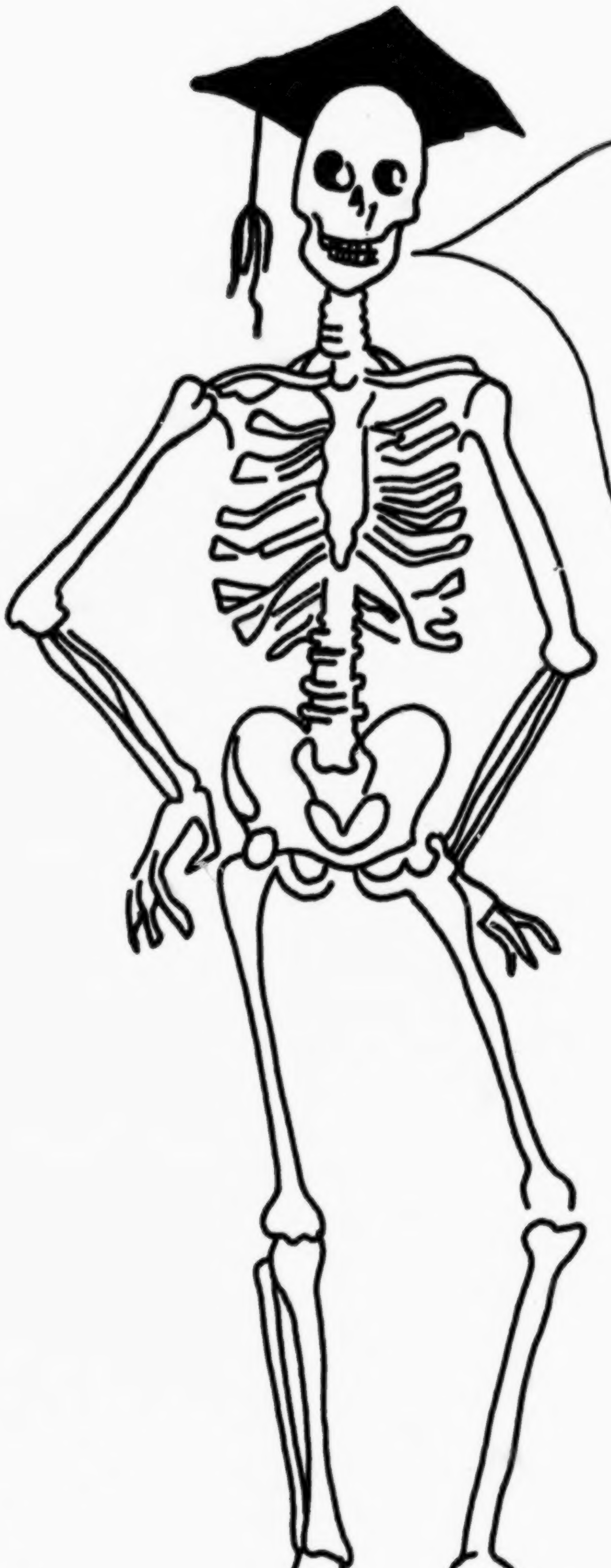
LONG-TERM GOALS STEM FROM PHILOSOPHIES WHICH IN TURN ARE REFLECTED IN LAW AND FORMAL STATEMENTS OF AN AGENCY

> *"TO MAINTAIN, EXTEND, AND IMPROVE V.E. FOR ALL"*

OBJECTIVES ARE MORE SPECIFIC STATEMENTS OF ANTICIPATED OUTCOMES WITHIN SPECIFIED TIME SPANS

> *"TO INCREASE OCCUPATIONAL EDUCATIONAL SERVICES TO NON-COLLEGE BOUND YOUTH AT AN ANNUAL RATE OF TEN PERCENT OVER THE NEXT FIVE YEARS"*

PROGRAM OBJECTIVES PROVIDE AN EXCELLENT BASIS FOR DEVELOPING PROGRAM BUDGETS



Anatomy of a Program Budget

ANATOMY OF A PROGRAM BUDGET

PROGRAM STRUCTURES SHOULD BE SYSTEMATICALLY ESTABLISHED

INFORMATION SHOULD BE SYSTEMATICALLY CREATED, COLLECTED, AND ANALYZED IN THE FRAMEWORK OF THE PROGRAM STRUCTURE

INPUTS (COSTS) AND OUTPUTS (BENEFITS) OF THE PROGRAM SHOULD BE CONSIDERED OVER A TIME FRAME OF AT LEAST FIVE YEARS

TERMINOLOGY FOR PPBS AND PROGRAM BUDGETS

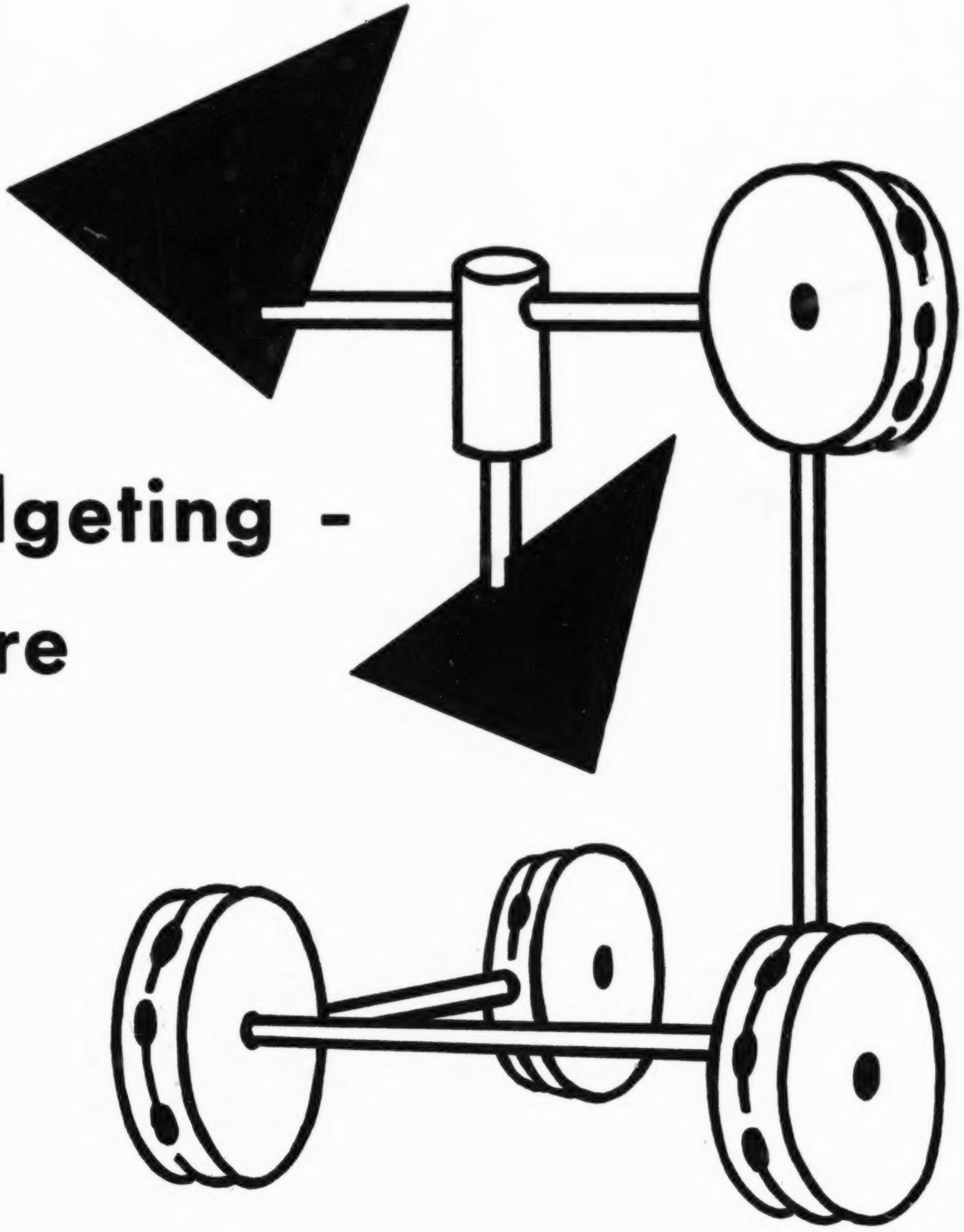
MISSION: DESCRIPTION OF THE ORGANIZATION'S REASON FOR EXISTENCE; USUALLY IMPOSED BY LAW; CORRESPOND TO PROGRAM

- GOALS: LONG-RANGE ACCOMPLISHMENTS TOWARDS WHICH THE ORGANIZATION'S EFFORTS ARE DIRECTED; CORRESPOND TO PROGRAM CATEGORIES
  - OBJECTIVES: MEASURABLE OUTPUTS AND SPECIFIED QUALITY, QUANTITY, AND TIME; CORRESPOND TO PROGRAM ELEMENTS

PROGRAM: A MAJOR ORGANIZATIONAL ENDEAVOR

- PROGRAM CATEGORY: A GROUPING OF PROGRAM ELEMENTS WHICH HAVE SIMILAR OUTPUTS
  - PROGRAM ELEMENT: BASIC UNIT OF PROGRAM STRUCTURE WHICH HAVE CLEARLY DEFINED OUTPUTS
    - ACTIVITIES: THE METHOD BY WHICH OBJECTIVES ARE ATTAINED
      - TASKS: AN ASPECT(S) OF AN ACTIVITY

Program Budgeting - What Structure



PROGRAM BUDGETING--WHAT STRUCTURE

THE BASIC CONCEPTUAL PROBLEM--ESTABLISHING PROGRAM STRUCTURES

OVERLAP OF PROGRAMS (HEALTH EDUCATION VERSUS PUBLIC HEALTH)

CONFLICT IN PROGRAM STRUCTURES AND ORGANIZATIONAL STRUCTURES

THE THREE PURPOSES OF BUDGETING (CONTROL, PERFORMANCE EVALUATION, PLANNING) GIVE RISE TO CONFLICTING DATA REQUIREMENTS

OTHERS

AFTER STUDY DECIDE ON THE PROGRAM STURCTURE WHICH APPROXIMATES THE PRODUCTS OR OUTPUTS THE AGENCY PRODUCES

PROGRAM STRUCTURE (OPTION #1) BASED UPON CONVENTIONAL GRADE-LEVEL ORGANIZATION*

GENERAL PROGRAM AREAS	PROGRAMS	SUBPROGRAMS
Instructional Programs		
	Early childhood and elementary schools	
		Prekindergarten
		Kindergarten
		Primary level
		Intermediate level
	Junior high schools	
	Senior and technical high schools	
	Adult and continuing education	
	Curriculum development	
	Summer schools	
	Instructional administration	
	Special services, programs and projects	
Central Direction Programs		
	Board of education	
	Office of superintendent	
	Planning and research	
	Personnel services and staff development	
	Business services	
		Administration, financial
		Budget development
Supporting Programs		
	Transportation	
	General capital improvements	
	Etc.	

---

*Adapted from Hartley, Harry J., Educational Planning, Programming, Budgeting: A Systems Approach, New York: Prentice Hall, 1968, p. 162.

PROGRAM STRUCTURE (OPTION #4) BASED UPON GRADE-LEVEL AND SUBJECT-MATTER ORGANIZATION*

GENERAL PROGRAM AREAS

Early childhood education (pre-K and K)

Primary grades education (grades 1-3; includes reading, English, etc.)

Intermediate grades education (4-6)

Social sciences and humanities (7-12)

Mathematics and science (7-12)

Creative arts (7-12 or K-12)

Physical and health education (7-12 or K-12)

Business, vocational, homemaking education (7-12)

Pupil personnel services (K-12)

Special education (K-12)

Adult education and community services

Administration and general support services

---

*Hartley, Harry J., Educational Planning, Programming, Budgeting: A Systems Approach, New York: Prentice Hall, 1968, p. 165.

PROGRAM STRUCTURE (OPTION #5) BASED UPON SERVICES PERFORMED BY AN INTERMEDIATE SCHOOL DISTRICT FOR LOCAL SCHOOL DISTRICTS*

GENERAL SERVICE PROGRAMS

Elementary grades special education

Secondary grades special education

Psychiatric services

Shared teacher services

Testing and counseling services

Technical and vocational education services

College conferences and career counseling services

Educational research services

Data processing services

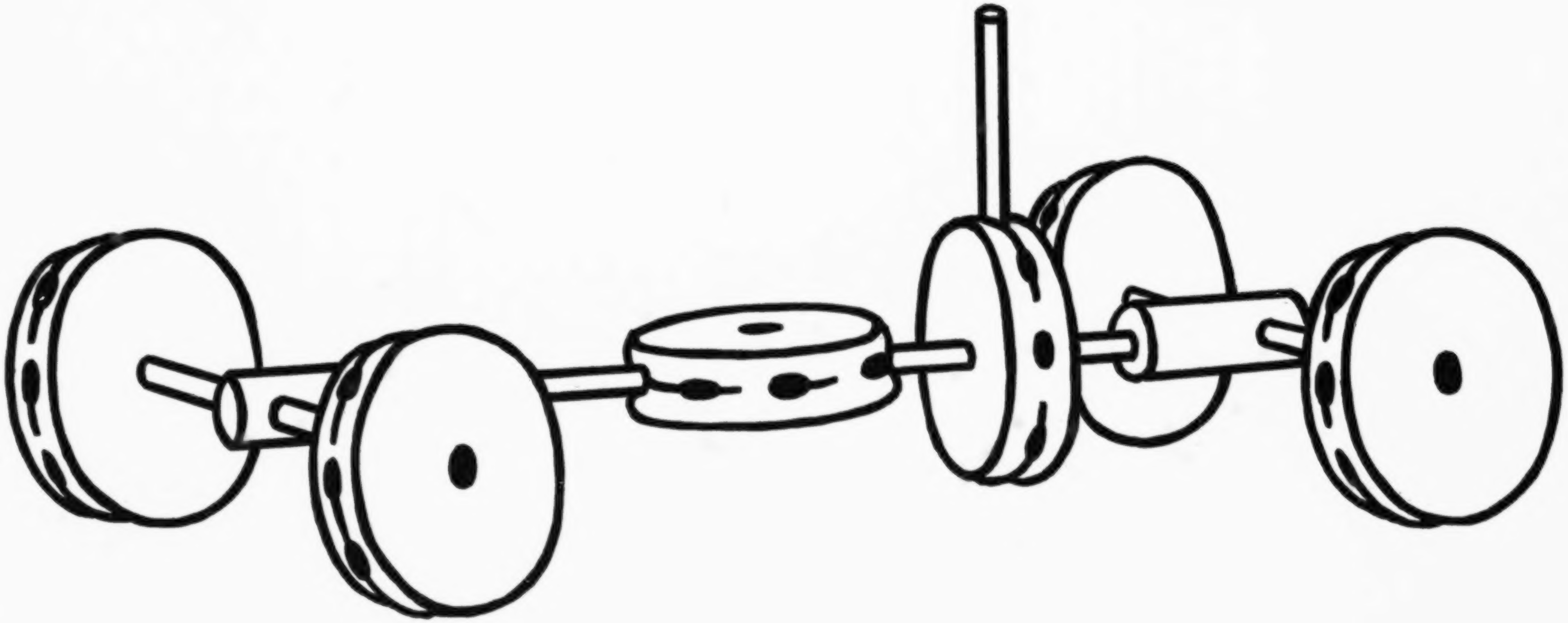
Transportation services

Administration and planning services

---

*Hartley, Harry J., Educational Planning, Programming, Budgeting: A Systems Approach, New York: Prentice Hall, 1968, p. 165.

Program Budgeting -
Developing the Program Structure



PROGRAM BUDGETING - DEVELOPING THE PROGRAM STRUCTURE

IDENTIFY ALL FINAL PRODUCTS OF THE AGENCY

1 WHAT IS DONE FOR WHOM? (PROGRAM CATEGORY)

   "VOCATIONAL EDUCATIONAL SERVICES FOR HANDICAPPED CHILDREN"

   "OCCUPATIONAL EDUCATION FOR UNEMPLOYED PERSONS"

2 WHAT IS DONE FOR WHOM, MORE SPECIFICALLY? (PROGRAM ELEMENT)

   "VOCATIONAL EDUCATION SERVICES FOR CRIPPLED CHILDREN"

   "OCCUPATIONAL EDUCATION FOR UNEMPLOYED YOUTH"

ASSIGN ALL PROGRAM ELEMENTS TO PROGRAM CATEGORIES

ASSIGN ALL PROGRAM CATEGORIES TO MAJOR PROGRAMS

REVIEW THE GOALS AND OBJECTIVES OF THE AGENCY IN TERMS OF THE FINAL PRODUCTS AND PROGRAMS THAT HAVE BEEN IDENTIFIED

ADJUST THE PROGRAMS AND/OR OBJECTIVES AS THE ANALYSIS MAY SUGGEST

HAVE ALL ACTIVITIES OF THE AGENCY BEEN IDENTIFIED?

CLASSIFYING NON-FINAL PRODUCT ACTIVITIES

NON-FINAL PRODUCT ACTIVITIES ARE THOSE INPUTS WHICH ARE CONSUMED IN THE PRODUCTION OF OTHER FINAL PRODUCTS BUT HAVE NO FINAL PRODUCT IDENTITY OF THEIR OWN (CENTRAL PERSONNEL, ACCOUNTING, COMPUTER, ETC.)

THESE ACTIVITIES SHOULD BE COSTED AND THEIR COST PRORATED TO OTHER OUTPUT GROUPINGS.

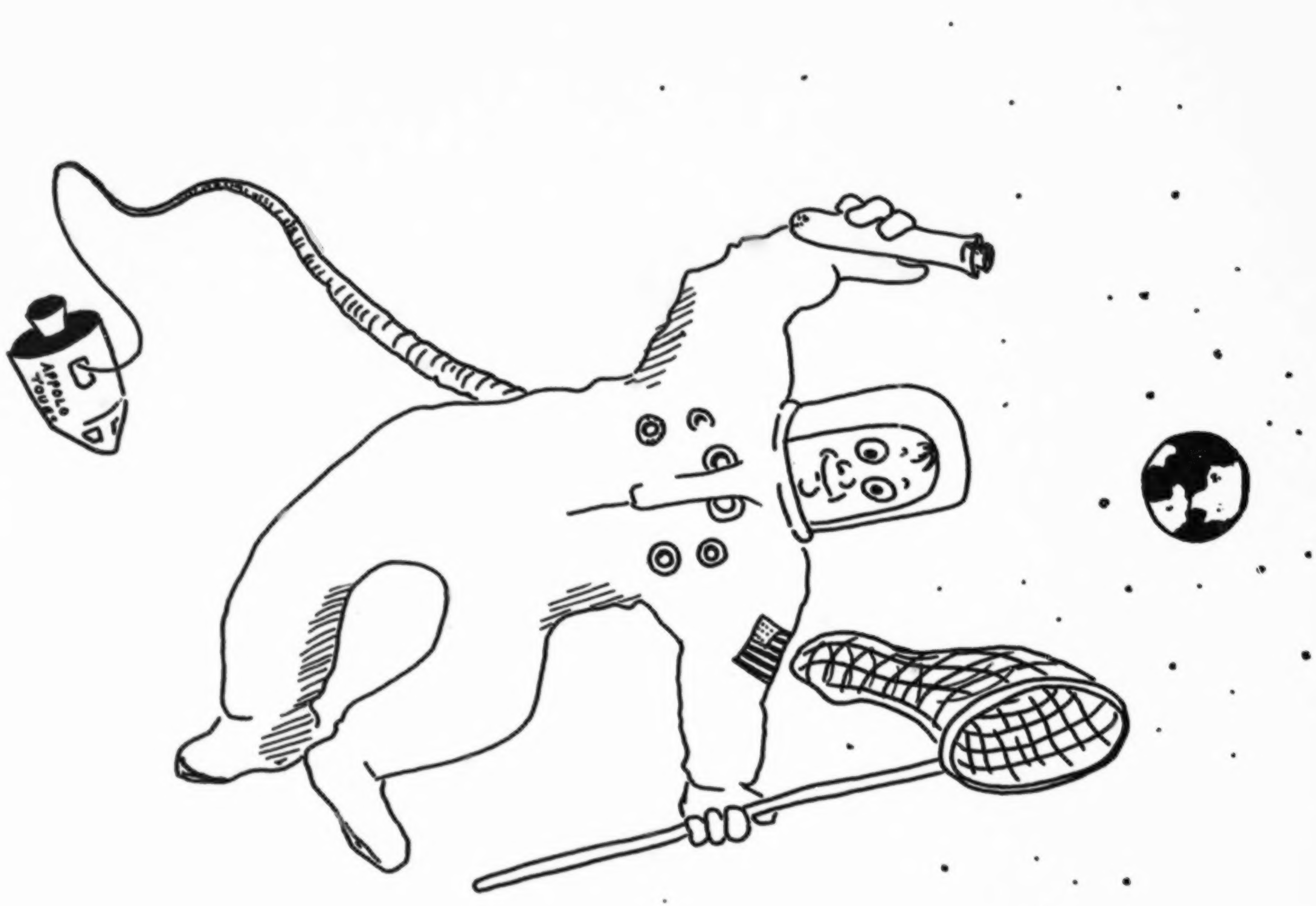
THESE ACTIVITIES ALSO SHOULD RETAIN THEIR SEPARATE ORGANIZATIONAL AND ACCOUNTING IDENTITIES.

WHEN COMPLETED, YOU SHOULD HAVE DEVELOPED A PROTOTYPIC CONCEPTUAL AND OPERATIONAL SYSTEM WHICH WILL SERVE AS A BASIS FOR ANALYSIS (COST/EFFECTIVENESS-COST/UTILITY)

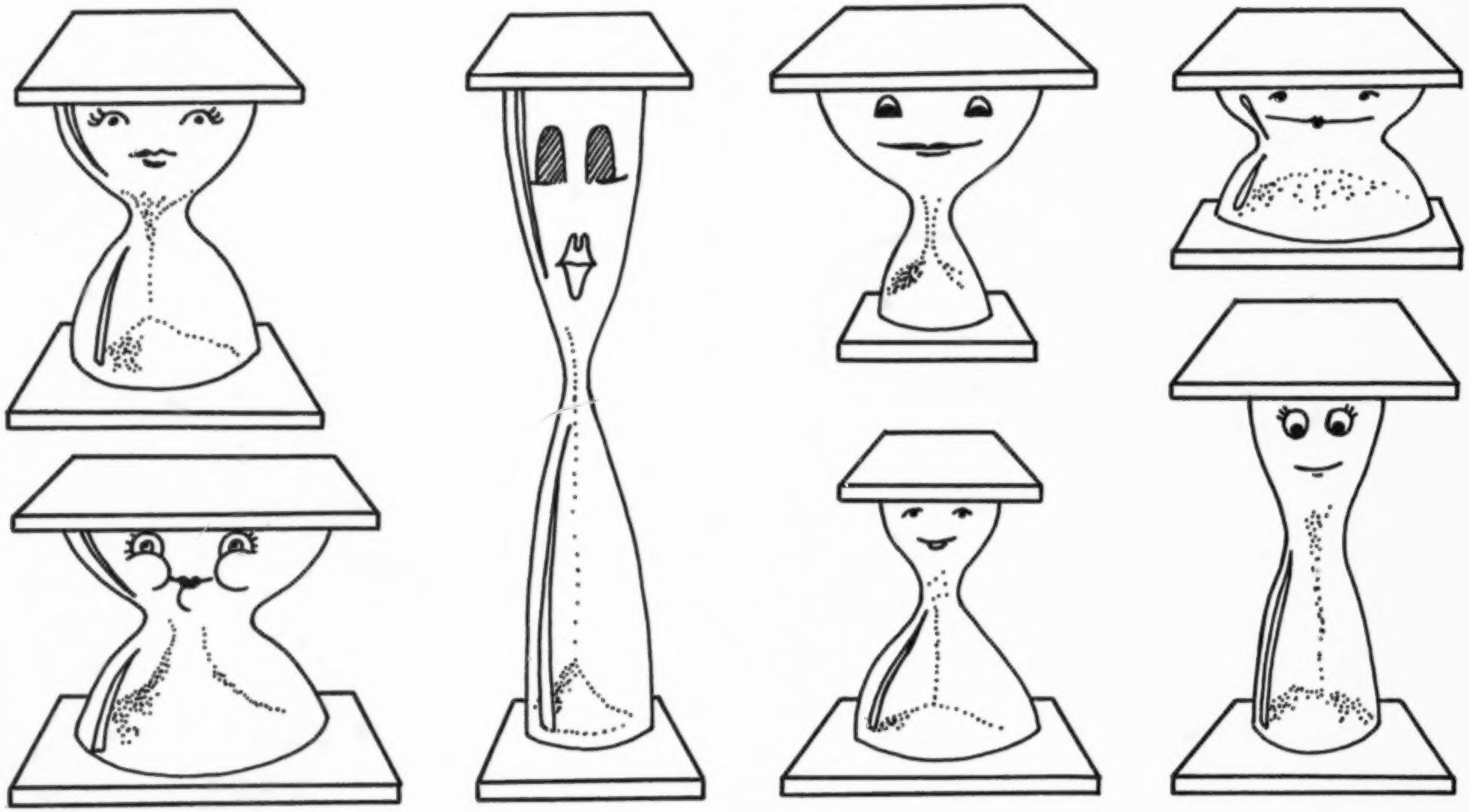
EXAMPLES OF OUTPUT-ORIENTED OBJECTIVES

OCCUPATIONAL EDUCATION FOR PERSONS (DEFINED BY):

- AGE GROUP
- OCCUPATIONAL CLUSTERS
- DEPRESSED OR GROWTH AREAS
- NEW OR EMERGING INDUSTRIES
- TEACHERS
- SOCIO-ECONOMIC GROUPINGS
- OTHERS:
    1
    2
    3


APPOLO
TOURS

The Quest for Relevant Data



The Question
# of the Proper Time Dimension

THE QUEST FOR RELEVANT DATA

MOST PUBLIC EDUCATION AGENCIES DO NOT HAVE COST ACCOUNTING SYSTEMS; THOSE THAT DO ARE ONLY PARTIAL AND NOT RELATED TO THE PROGRAM STRUCTURES.

INITIALLY, THE PROGRAM SPECIALISTS AND THE ACCOUNTING PERSONNEL MUST REORDER THE EXISTING DATA BASED ON ESTIMATED COSTS ASSOCIATED WITH THE ADOPTED PROGRAM STRUCTURES. IN THE LONG RUN, ACCOUNTING SYSTEMS CAN BE ADAPTED TO PROVIDE PROGRAM-ORIENTED DATA.

THE QUESTION OF THE PROPER TIME DIMENSION

EDUCATION HAS VARIABLE AS WELL AS LONG-TERM INPUT AND OUTPUT RELATIONSHIPS. CONSIDER TOOTHPASTE OR POULTRY VERSUS EDUCATION.

SELECTION OF APPROPRIATE TIME FRAMES

- ONE YEAR (FOR LEGAL AND CULTURAL REASONS) IS USUALLY THE SUBUNIT.

- AT LEAST FIVE UNITS SHOULD BE ANALYZED AT ONE TIME BECAUSE OF LONG-TERM INPUTS AND OUTPUTS.

PROGRAM BUDGETING--SUMMARY

ESTABLISH PROGRAM STRUCTURES--TIED TO OUTPUT-ORIENTED OBJECTIVES

COLLECT AND ANALYZE INFORMATION IN THE FRAMEWORK OF THE STRUCTURE

CONSIDER INPUTS AND OUTPUTS OF THE PROGRAM, PROGRAM CATEGORY OR PROGRAM ELEMENT OVER A TIME FRAME OF AT LEAST FIVE YEARS

REFINE THE PROGRAM STRUCTURE, INFORMATION SYSTEM(S) AND ANALYTIC PROCEDURES AS THE AGENCY GAINS MORE EXPERIENCE AND IMPROVES ITS ANALYTIC CAPABILITY

SECTION 6

ANALYSIS OF ALTERNATIVES

A. *Objective.* The objective of this section is to provide the learner with knowledge and skills related to the measurement and analysis of benefits and costs in education.

B. *Desired Outcomes.* If the general objective of this section has been achieved, the learner should be able to:

1. Identify four problems encountered in measuring benefits and costs.
2. Identify the supply of capital.
3. Identify the elements of interest.
4. Identify the sources that determine interest rates.
5. Differentiate between the future value of current resources and present value of future returns.
6. Outline the advantages and disadvantages of several investment criteria.
7. Define accounting rates of return, internal rate of return, benefit-cost ratios, etc.
8. Identify the criteria for evaluating investment.
9. Outline the constraints on investment criteria.
10. Define sensitivity analysis.

C. *Prerequisites.* Satisfactory achievement of the objectives outlined in Sections 1 and 4. It is also desirable for the learner to achieve the objectives of Sections 2, 3, and 5.

D. *Placement of Section in Sequence.* This section may be used independently. It is recommended that at least Sections 1 and 4 precede this section.

E. *Pre-evaluation.* The learner may be asked to demonstrate achievement of specific objectives of Sections 3 and 4.

F. *Minimum Time Estimate.* Approximately four to eight hours should be devoted to the lecture-discussion of the basic concepts presented in this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Problems of Measurement	101
a. Nonproductive Benefits	102
b. Productive Benefits	103-105

c. Individual Costs	106
d. Organizational Costs	107
e. Benefits and Costs	108-110
2. Interest and Returns	111
a. Interest	112, 113
b. Discounting	114-116
3. Investment Criteria	
a. Urgency	117
b. Payback	117
c. Annual Costs and Benefits	118
d. Accounting Rates of Return	119
e. Internal Rate of Return	120
f. Net Present Value	121
g. Cost-Benefit Ratio	122
h. Cost-Utility Ratio	123
i. Cost-Effectiveness Ratio	124
4. Evaluation of Criteria	125-127
5. Sensitivity Analysis	128-130

H. *Suggested Instructional Activities*

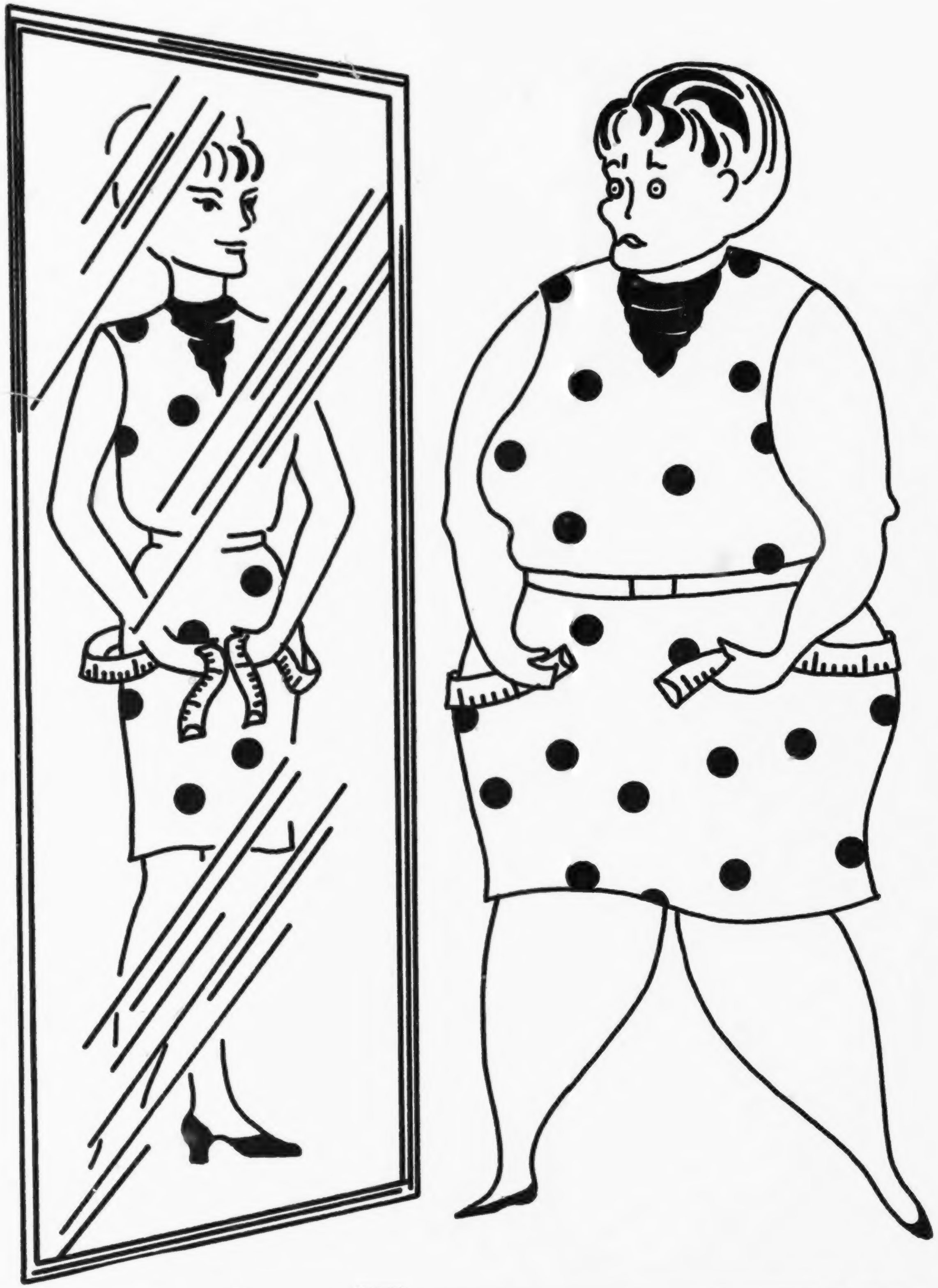
1. The learners could be asked to complete the Benefit Cost Problem in *Volume II: A Case Problem.*
2. The learners may be asked to complete Steps V and VI of the case problem in *Volume II.*
3. A lecture presenting the general objectives of this section may precede small group instruction.
4. Small group or individual instruction may be conducted through problem-solving packets developed from the basic guidelines.

I. *Reference Material.*

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. Jacob J. Kaufman *et al.*, *An Analysis of Comparative Costs and Benefits of Vocational Versus Academic Education in Secondary Schools: Preliminary Report* (University Park: IRHR. Pennsylvania State University, 1967).
4. Burton A. Weisbrod, "Income Redistribution Effects and Benefit-Cost Analysis," in Robert Dorfman (ed.), *Measuring Benefits of Government Investments* (Washington: The Brookings Institution, 1965).
5. J. Robert Warmbrod, *Review and Synthesis of Research on the Economics of Vocational-Technical Education* (Columbus: The Center for Vocational and Technical Education, 1968).
6. Jesse Burkhead *et al.*, *Input and Output in Large-City Schools* (Syracuse, New York: Syracuse University Press, 1967).

J. *Instructional Aids*--pages 101 through 130.

Problems of Measurement



PROBLEMS OF MEASUREMENT

NONPRODUCTIVE BENEFITS

DIRECT: TO THE INDIVIDUAL

INDIRECT: TO SOCIETY

OPTIONS:

1. IGNORE
2. STATE IN EXPLICIT TERMS
3. MEASURE IN QUANTITATIVE TERMS
4. MEASURE IN MONETARY TERMS

PROBLEMS OF MEASUREMENT

PRODUCTIVE BENEFITS

DIRECT: TO THE INDIVIDUAL

WAGE LEVELS
PERCENT OF TIME EMPLOYED

DEPEND ON:

1. SUPPLY OF LABOR
2. DEMAND FOR LABOR
3. INSTITUTIONAL ARRANGEMENTS
   - --MINIMUM WAGE LAWS
   - --LABOR UNIONS
   - --LABOR MOBILITY
4. GENERAL PRICE LEVEL
5. STATE OF THE ECONOMY
   - --HIGH EMPLOYMENT
   - --LOW EMPLOYMENT

OPTIONS:

1. ASSUME CONSTANT WAGE LEVELS
2. PROJECT HISTORICAL TRENDS
3. COMPLEX ANALYSIS

VACATIONS, SICK-LEAVE, AND RETIREMENT BENEFITS

OPTIONS:

1. IGNORE
2. STATE IN EXPLICIT TERMS
3. ESTIMATE IN MONETARY TERMS
   - --DIRECT ESTIMATION
   - --PERCENTAGE OF WAGE LEVEL

PROBABILITY OF FURTHER EDUCATION

OPTIONS:

1. IGNORE
2. ESTIMATE THE PROBABILITY
3. ESTIMATE THE PROBABILITY AND ITS MONETARY VALUE

PROBLEMS OF MEASUREMENT

PRODUCTIVE BENEFITS

INDIRECT: TO SOCIETY

TAX REVENUES

OPTIONS:

1 IGNORE
2 COMPUTE ON BASIS OF TAX SCHEDULES

GOVERNMENT EXPENDITURES

OPTIONS:

1 IGNORE
2 STATE IN EXPLICIT TERMS
3 ESTIMATE DECREASE IN NUMBERS OF PERSONS
4 ESTIMATE DECREASE IN MONETARY EXPENDITURES

AGGREGATE LEVEL OF EMPLOYMENT

OPTIONS:

1 IGNORE
2 ESTIMATE CHANGE IN EMPLOYMENT RATES
3 ESTIMATE MONETARY BENEFITS OF CHANGE (CHANGE IN GNP)

PARENTAL SUPERVISION TIME

OPTIONS:

1 IGNORE
2 STATE IN EXPLICIT TERMS
3 ESTIMATE COST OF ALTERNATIVE SUPERVISION METHODS
4 ESTIMATE FOREGONE EARNINGS OF PARENT

PROBLEMS OF MEASUREMENT

PRODUCTIVE BENEFITS (CONT.)

INDIRECT: TO SOCIETY

PRODUCTIVITY OF FELLOW WORKERS

OPTIONS:

1 ASSUME NO CHANGE
2 STATE IN EXPLICIT TERMS
3 ESTIMATE CHANGE

TRANSMISSION OF KNOWLEDGE TO CHILDREN

OPTIONS:

1 ASSUME NO CHANGE
2 STATE IN EXPLICIT TERMS
3 ESTIMATE IN QUANTITATIVE TERMS
4 ESTIMATE IN MONETARY TERMS

DIRECT COSTS OF CRIME TO SOCIETY

OPTIONS:

1 ASSUME NO CHANGE
2 STATE IN EXPLICIT TERMS
3 ESTIMATE CHANGE IN VALUE OF PROPERTY AND LIFE DESTROYED

PROBLEMS OF MEASUREMENT

COSTS OF RECEIVING EDUCATION

ADDITIONAL COSTS

OPTIONS:

1 IGNORE

2 ESTIMATE CHANGE

--STATISTICAL ANALYSIS

--DIRECT COMPUTATION

OPPORTUNITY COSTS

DEPEND ON:

1 EMPLOYMENT CONDITIONS

2 INSTITUTIONAL ARRANGEMENTS

OPTIONS:

1 IGNORE

2 ESTIMATE COSTS

--EARNINGS OF COMPARABLE NONSTUDENTS

--PREVIOUS EARNINGS OF STUDENTS

PROBLEMS OF MEASUREMENT

COSTS OF SUPPLYING EDUCATION

CURRENT OPERATING COSTS

OPTIONS:

1 COMPUTE BY SCHOOL SYSTEM
2 COMPUTE TOTAL COSTS BY PROGRAM

--LOCAL COSTS ONLY
--STATE COSTS ONLY
--NATIONAL COSTS ONLY

COST CORRECTION FACTORS

OPTIONS:

1 IGNORE
2 COMPUTE VALUE OF TAX EXEMPTIONS

JOINT COSTS

OPTIONS:

1 IGNORE
2 PRORATE AMONG PROGRAMS
3 INCLUDE ONLY WHEN SUMMING COSTS OF ALL PROGRAMS WITHIN A SCHOOL SYSTEM

CAPITAL EXPENDITURES

VALUE OF EXISTING CAPITAL STOCK

OPTIONS:

1 OPPORTUNITY COSTS ARE ZERO, THEREFORE VALUE OF STOCK IS ZERO
2 HISTORICAL OR ORIGINAL VALUE
3 CURRENT ASSESSED VALUATION
4 REPLACEMENT COST OF STOCK
5 PRESENT DISCOUNTED VALUE OF STOCK

ANNUAL COST OF CAPITAL STOCK

OPTIONS:

1 ESTIMATE "ANNUAL RENT" WHICH AN EQUAL AMOUNT OF CAPITAL WOULD EARN IN THE PRIVATE SECTOR
2 AMORTIZE THROUGH TIME

PROBLEMS OF MEASUREMENT

BENEFITS AND COSTS

WHO PAYS? WHO BENEFITS? (WHAT IS THE RELEVANT SYSTEM FOR ANALYZING BENEFITS AND COSTS OF EDUCATION?)

ALTERNATIVES

1. THE STUDENT
2. THE CLASS, PROGRAM OR ATTENDANCE AREA
3. THE LOCAL SCHOOL SYSTEM
4. THE COMMUNITY
5. THE STATE
6. THE REGION
7. THE TOTAL COUNTRY
8. THE WORLD

PROBLEMS

COST SHARING BY LOCAL, STATE AND FEDERAL SYSTEMS

SOLUTION

ALL COSTS AND BENEFITS (PRIVATE, LOCAL, STATE AND FEDERAL) SHOULD BE INCLUDED IN EVALUATING EDUCATIONAL PROGRAMS AT ANY LEVEL OF AGGREGATION

PROBLEMS OF MEASUREMENT

BENEFITS AND COSTS

RISK, UNCERTAINTY AND TECHNOLOGY CHANGES CAN BE COMPENSATED FOR BY:

1. MAKING ONE'S ASSUMPTIONS AND PROJECTIONS EXPLICIT
2. MAKING STATISTICAL PROJECTIONS
3. ASSIGNING RELATIVE PROBABILITIES TO THE SET OF POSSIBLE FUTURE EVENTS
4. INCLUDING A RISK PREMIUM IN THE INTEREST RATE USED FOR DISCOUNTING
5. PLACING A HIGH PRIORITY ON THE ADAPTABILITY OF FACILITIES AND GRADUATES

MARKET PRICES VERSUS SOCIAL VALUE

MARGINAL VERSUS AVERAGE

CONDITION OF THE ECONOMY

POLITICAL CONDITIONS

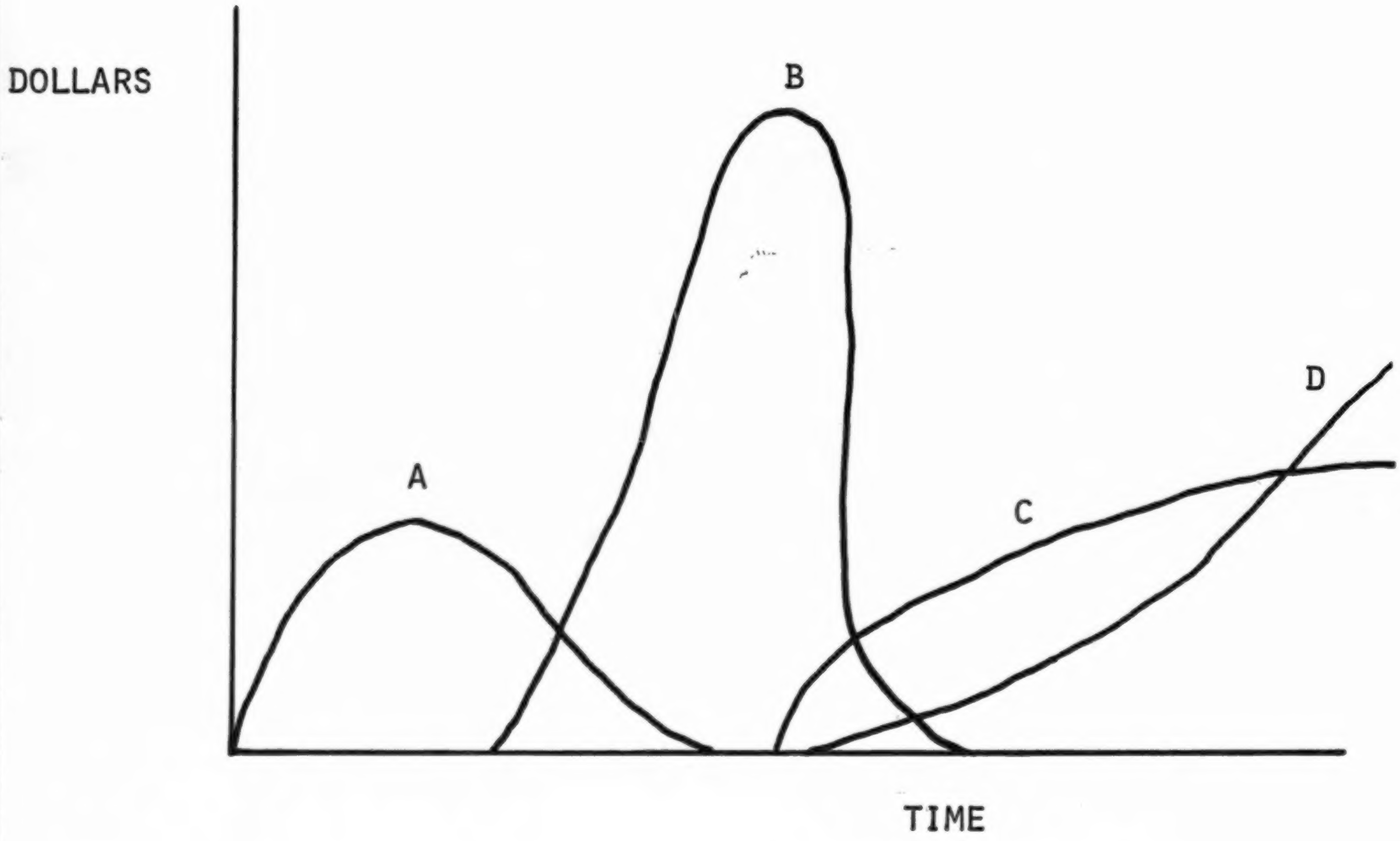
INDIVIDUAL SUBJECTIVE EVALUATIONS

EQUALITY: INCOME, RACE, REGION, CREED, SEX, ETC.

PROBLEMS OF MEASUREMENT

BENEFITS AND COSTS

TIME AND LENGTH OF OCCURENCE



A = RESEARCH AND DEVELOPMENT COSTS

B = INITIAL CAPITAL INVESTMENT COSTS

C = OPERATING COSTS

D = BENEFITS

Interest and Returns to Investment

INTEREST AND RETURNS TO INVESTMENT

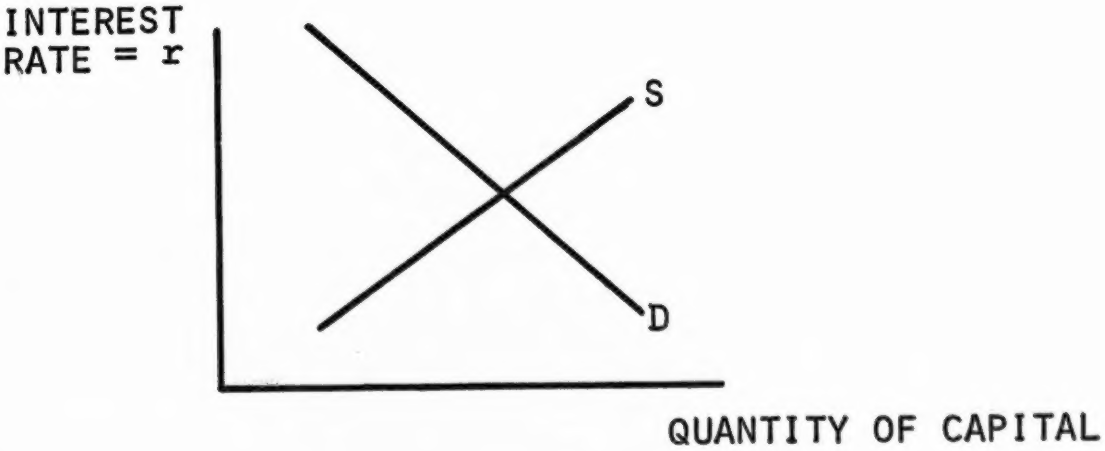
INTEREST

DEFINITION: THE PAYMENT FOR THE USE OF LOANABLE FUNDS; THE PRICE OF MONEY AND CAPITAL

DETERMINATION: PURE INTEREST

SUPPLY OF CAPITAL

1 SAVINGS OF CONSUMERS (DEFERRED CONSUMPTION)
2 SAVINGS OF BUSINESS FIRMS
3 BANK CREDIT (NEW MONEY)



DEMAND FOR CAPITAL

1 CONSUMPTION
2 MARGINAL PRODUCTIVITY OF CAPITAL-INVESTMENT
3 LIQUIDITY PREFERENCE FOR CASH

COMPONENTS OF INTEREST

PURE INTEREST

NECESSARY PAYMENT TO LENDERS TO OVERCOME THEIR DESIRE TO HOLD WEALTH IN THE FORM OF MONEY (LIQUIDITY PREFERENCE) OR TO CONSUME THEIR INCOME IN THE PRESENT RATHER THAN THE FUTURE.

ADMINISTRATIVE COSTS

NECESSARY PAYMENT TO COVER LENDER'S BUSINESS EXPENSES.

RISK

NECESSARY TO OVERCOME THE CHANCE OF LOSS IF THE BORROWER DEFAULTS.

DIFFERENTIAL INTEREST RATES

PRIVATE

DETERMINED BY THE SUPPLY AND DEMAND FOR MONEY AND INCLUDES ADMINISTRATIVE COSTS, AND RISK PREMIUM.

PUBLIC

ONLY PARTIALLY DETERMINED BY THE SUPPLY AND DEMAND FOR MONEY AND MAY EXCLUDE ADMINISTRATIVE COSTS AND RISK PREMIUM.

OPPORTUNITY COST

DETERMINED BY THE RATE OF RETURN WHICH THE CAPITAL CAN EARN IN THE BEST ALTERNATIVE INVESTMENT; A THEORETICAL INTEREST RATE USED IN CERTAIN RESEARCH SITUATIONS.

LOGIC OF DISCOUNTING

FUTURE VALUE OF CURRENT RESOURCES

$$F.V._t = P.V.\ (1+r)^t$$

WHERE:
F.V. = FUTURE VALUE
P.V. = PRESENT VALUE
r = INTEREST RATE
t = NUMBER OF THE YEAR

EXAMPLE: $P.V. = \$100.00$
$r = 6\%$
$t = 1$
$F.V. = 100\ (+.06)^1 = \$106.00$

PRESENT VALUE OF FUTURE RETURNS

$$P.V. = \frac{F.V._t}{(1+r)^t} = \sum_{t=1}^{n} \frac{F.V._t}{(1+r)^t} = \frac{F.V._1}{(1+r)^1} + \frac{F.V._2}{(1+r)^2} + \frac{F.V._3}{(1+r)^3} \cdots \frac{F.V._n}{(1+r)^n}$$

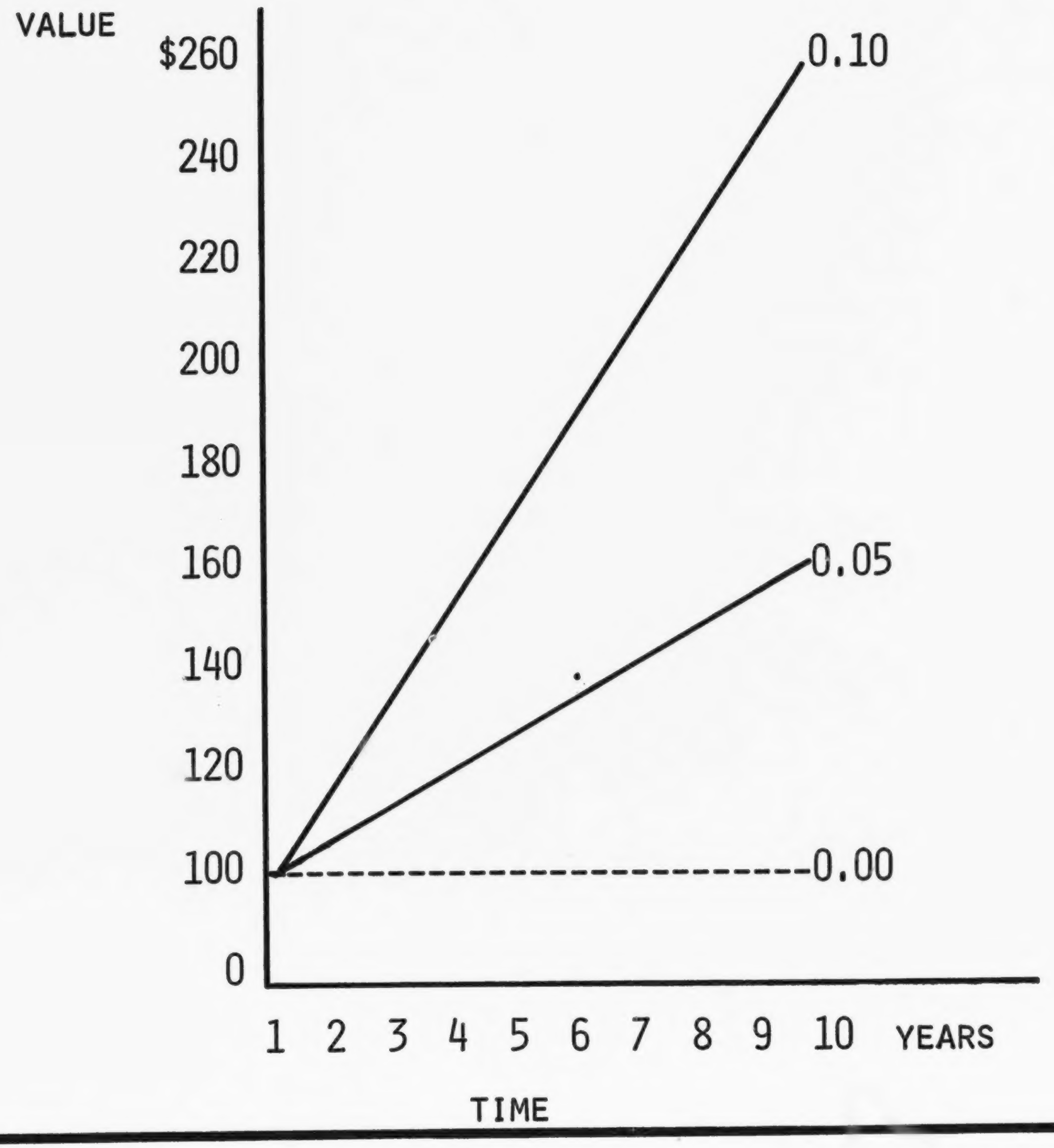
EXAMPLE:

$$P.V. = \sum_{t=1}^{3} \frac{100_t}{(1+r)^t} = \frac{100}{(1.06)^1} + \frac{100}{(1.06)^2} + \frac{100}{(1.06)^3} =$$

$$\frac{100}{1.06} + \frac{100}{1.12} + \frac{100}{1.19} = 94.34 + 89.76 + 84.03 = \$268.13$$

FUTURE VALUE OF CURRENT RESOURCES (INVESTMENT)

$$F.V._t = P.V. \ (1 + r)^t$$

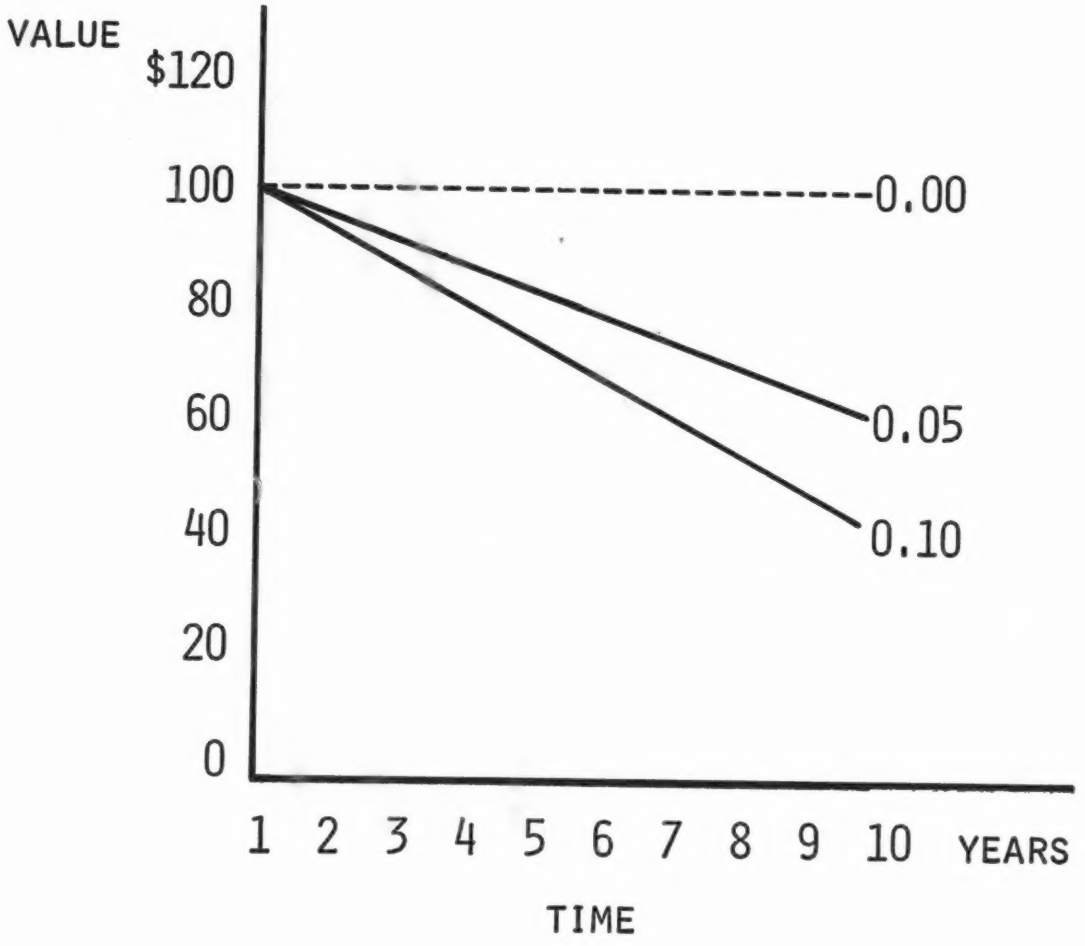


YEAR	$F.V._t$ @0.00	$F.V._t$ @0.05	$F.V._t$ @0.10
0	100	100	100
1	100	105	110
2	100	110	121
3	100	116	133
4	100	122	146
5	100	128	161
6	100	134	177
7	100	141	195
8	100	148	214
9	100	155	235
10	100	163	258

$F.V._t$ = Future Value at Year t of $100 Invested at Interest Rate r.

PRESENT VALUE OF FUTURE RETURNS (EARNINGS)

$$P.V. = \frac{F.V._t}{(1 + r)^t}$$



YEAR	$P.V._t$ @0.00	$P.V._t$ @0.05	$P.V._t$ @0.10
0	100	100	100
1	100	95.20	90.90
2	100	90.90	82.60
3	100	86.20	75.20
4	100	82.00	68.50
5	100	78.10	62.10
6	100	74.60	56.50
7	100	70.90	51.30
8	100	67.60	46.70
9	100	64.50	42.60
10	100	61.40	38.80

$P.V._t$ = Present Value of a Return of $100 in Year t Discounted at Interest Rate r

INVESTMENT CRITERIA

URGENCY

SIMPLY A STATEMENT BY A PROPONENT OF A PROJECT RECOMMENDING THAT THE PROJECT BE UNDERTAKEN. THE USE OF THIS CRITERION MEANS ACCEPTANCE OF PROJECTS ON THE BASIS OF NOTHING MORE SUBSTANTIAL THAN THE PERSUASIVENESS OF THEIR PROPONENTS.

PAYBACK

THE LENGTH OF TIME REQUIRED FOR THE CASH INCOME FROM A PROJECT TO PAY BACK THE INITIAL INVESTMENT COSTS. IT SEEKS TO IDENTIFY THE PROJECT WITH THE SHORTEST PAYBACK PERIOD.

ADVANTAGES

SIMPLE AND EASY TO COMPUTE

GIVES HIGH WEIGHT TO IMMEDIATE CERTAIN RETURNS

DISADVANTAGES

CANNOT COMPARE SHORT- AND LONG-RANGE PROJECTS

IGNORES RETURNS AND COSTS AFTER PAYBACK PERIOD

ANNUAL COSTS AND BENEFITS

DEFINITION: AN EQUIVALENT ANNUAL PAYMENT DERIVED FROM INITIAL INVESTMENT COSTS, INCLUDING INTEREST COSTS, COMPARED TO AVERAGE ANNUAL NET SAVINGS OR PROFIT.

EXAMPLE: INITIAL INVESTMENT COST OF PROJECT IS $10,000 AND YIELDS $1000.00 NET BENEFITS PER YEAR FOR 20 YEARS. USE A 10 PERCENT INTEREST RATE.

ANNUAL BENEFITS = $1000.00

$$\text{ANNUAL COSTS} = X = \frac{10,000}{(1.10)^{20}} = \$1175.00$$

ANNUAL BENEFITS ($1000) ANNUAL COSTS ($1175.00)

ADVANTAGES:

- SIMPLE AND EASY TO CALCULATE
- CONSIDERS ENTIRE LIFE OF PROJECT

DISADVANTAGES:

- REALISTIC ONLY IF ANNUAL NET BENEFITS ARE CONSTANT THROUGH TIME

ACCOUNTING RATES OF RETURN

DEFINITION: THE AVERAGE RETURN PER YEAR DIVIDED BY AVERAGE OR TOTAL INVESTMENT

EXAMPLE:

	YEAR 1	YEAR 2	YEAR 3	AVERAGE
CASH INCOME	\$1500	\$2000	\$2500	\$2000
DEPRECIATION	1000	1000	1000	1000
NET INCOME	500	1000	1500	1000
BOOK VALUE				
JAN. 1	5000	4000	3000	
DEC. 31	4000	3000	2000	
AVERAGE	4500	3500	2500	3500

RATE OF RETURN I $\frac{1000}{3500} \times 100 = 28.6\%$

RATE OF RETURN II $\frac{1000}{5000} \times 100 = 20.0\%$

ADVANTAGES: SIMPLE AND EASY TO CALCULATE

CONSIDERS ENTIRE LIFE OF PROJECT

DISADVANTAGES: GIVES EQUAL WEIGHT TO PROFITS EARNED IN FIRST AND LAST YEARS

INTERNAL RATE OF RETURN

DEFINITION: THE RATE OF INTEREST WHICH WILL EQUATE THE PRESENT VALUE OF ALL THE BENEFITS WITH ALL COSTS OF A PROJECT.

$$\left[\sum_{t=1}^{n} \frac{R_t}{(1+r)^t}\right] = \left[\sum_{t=1}^{n} \frac{C_t}{(1+r)^t}\right]$$

R_t = ANNUAL RETURN
C_t = ANNUAL COSTS
r = INTEREST RATE
t = TIME
n = LIFE OF PROJECT

SOLVE FOR r, THE INTEREST RATE

ADVANTAGES: CONSIDERS ALL BENEFITS, COSTS AND TIME

RESOLVES PROBLEM OF SELECTING INTEREST RATE UNTIL LATER

DISADVANTAGES: VERY DIFFICULT TO CALCULATE

A RATE OF INTEREST WILL STILL HAVE TO BE SELECTED WHERE PROJECTS WILL BE UNDERTAKEN

NET PRESENT VALUE

DEFINITION: THE DIFFERENCE BETWEEN THE PRESENT VALUE OF ALL BENEFITS AND OF ALL COSTS OF A PROJECT.

$$\text{N.P.V.} = \left[\sum_{t=1}^{n} \frac{R_t}{(1+r)^t} - \sum_{t=1}^{n} \frac{C_t}{(1+r)^t}\right] = \left[\sum_{t=1}^{n} \frac{R_t - C_t}{(1+r)^t}\right]$$

EXAMPLE:

YEAR	BENEFITS	COSTS
1	\$------	\$10,000
2	10,000	5,000
3	20,000	5,000

$$\text{N.P.V.} = \frac{-10,000}{(1.10)^1} + \frac{5,000}{(1.10)^2} + \frac{15,000}{(1.10)^3} =$$

$$-9,091 + 4,132 + 11,278 = 6,319$$

ADVANTAGES: CONSIDERS ALL BENEFITS, COSTS AND TIME

DISADVANTAGES: IGNORES NONMONETARY BENEFITS OR REQUIRES THEIR ESTIMATION IN MONETARY TERMS

BENEFIT-COST RATIO

(COST-BENEFIT RATIO)

DEFINITION: A RATIO OF THE MONETARY BENEFITS DERIVED FROM A PROJECT TO ITS COSTS

$$B\text{-}C = \frac{\sum_{t=1}^{n} \frac{R_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{C_t}{(1+r)^t}}$$

$R_t = P_t \cdot Q_t =$ the price or monetary value times the quantity of output in year t

EXAMPLE:

YEAR	OUTPUT	PRICE	COSTS
1	-0-	$200	$10,000
2	50	200	5,000
3	100	200	5,000

$$B\text{-}C = \frac{\frac{200(0)}{(1.10)^1} + \frac{200(50)}{(1.10)^2} + \frac{200(100)}{(1.10)^3}}{\frac{10,000}{(1.10)^1} + \frac{5,000}{(1.10)^2} + \frac{5,000}{(1.10)^3}} = \frac{0 + 8,264 + 15,038}{9,091 + 4,132 + 3,759} = 1.37$$

ADVANTAGES: CONSIDERS ALL MONETARY BENEFITS, COSTS AND TIME

DISADVANTAGES: IGNORES NONMONETARY BENEFITS OR REQUIRES THEIR ESTIMATION IN MONETARY TERMS

COST-UTILITY RATIO

DEFINITION: A RATIO OF THE UTILITY (VALUE) DERIVED FROM A PROJECT TO ITS COSTS

$$C\text{-}U = \frac{\displaystyle\sum_{t=1}^{n} \frac{U_t}{(1+r)^t}}{\displaystyle\sum_{t=1}^{n} \frac{C_t}{(1+r)^t}}$$

$U_t = W_t \cdot Q_t$ = A weighting factor times the quantity of output in year t

EXAMPLE:

YEAR	OUTPUT	WEIGHT	COSTS
1	-0-	80	$10,000
2	50	80	5,000
3	100	80	5,000

$$C\text{-}U = \frac{\dfrac{80(0)}{(1.10)^1} + \dfrac{80(50)}{(1.10)^2} + \dfrac{80(100)}{(1.10)^3}}{\dfrac{10,000}{(1.10)^1} + \dfrac{5,000}{(1.10)^2} + \dfrac{5,000}{(1.10)^3}} =$$

$$\frac{0 + 4,000 + 8,000}{9,091 + 4,132 + 3,759} = .7066$$

ADVANTAGES: CONSIDERS ALL COSTS, UTILITY, AND TIME

DISADVANTAGES: REQUIRES THE DEVELOPMENT OF AN ARTIFICIAL WEIGHTING SYSTEM

COST-EFFECTIVENESS RATIO

DEFINITION: A RATIO OF THE QUANTITY OF OUTPUT DERIVED FROM A PROJECT TO ITS COSTS

$$C\text{-}E = \frac{\sum_{t=1}^{n} \frac{Q_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{C_t}{(1+r)^t}}$$

Q_t = Annual Quantity of Output

EXAMPLE:

YEAR	OUTPUT	COSTS
1	-0-	$10,000
2	50	5,000
3	100	5,000

$$C\text{-}E = \frac{\frac{0}{(1.10)^1} + \frac{50}{(1.10)^2} + \frac{100}{(1.10)^3}}{\frac{10,000}{(1.10)^1} + \frac{5,000}{(1.10)^2} + \frac{5,000}{(1.10)^3}} =$$

$$\frac{0 + 41 + 75}{9,091 + 4,132 + 3,759} = .0068$$

ADVANTAGES: CONSIDERS ALL COSTS, OUTPUT AND TIME

VALID FOR COMPARING ALTERNATIVE ACTIVITIES WHICH PRODUCE AN IDENTICAL TYPE AND QUALITY OF OUTPUT

DISADVANTAGES: INVALID IF OUTPUTS ARE OF DIFFERING TYPE OR QUALITY

DOES NOT CONSIDER VALUE OF OUTPUT

3

EVALUATION OF INVESTMENT CRITERIA

EVALUATION MEASURES					
CRITERIA	BENEFITS	COST	TIME	CALCULATION	OTHER
1 URGENCY	NONE	NONE	NONE	NONE	A STATEMENT FAVORING A PROJECT
2 PAYBACK	IGNORES BENEFITS AFTER PAYBACK PERIOD	IGNORES OPERATING COSTS	EQUAL WEIGHT TO NEAR AND DISTANT RETURNS	VERY EASY	
3 ACCOUNTING RATES OF RETURN	CONSIDERS ALL MONEY BENEFITS	CONSIDERS ALL COSTS EXCEPT THE COST OF MONEY	EQUAL WEIGHT TO NEAR AND DISTANT RETURNS	EASY	
4 ANNUAL COSTS AND BENEFITS	CONSIDERS ALL MONEY BENEFITS	CONSIDERS ALL COSTS	REALISTIC ONLY IF ANNUAL NET BENEFITS ARE EQUAL	EASY	
5 INTERNAL RATE OF RETURN	CONSIDERS ALL MONEY BENEFITS	CONSIDERS ALL COSTS	CONSIDERS TIME	VERY DIFFICULT	RESOLVES PROBLEM OF A PRIORI INTEREST RATE SELECTION

EVALUATION OF INVESTMENT CRITERIA (CONT.)

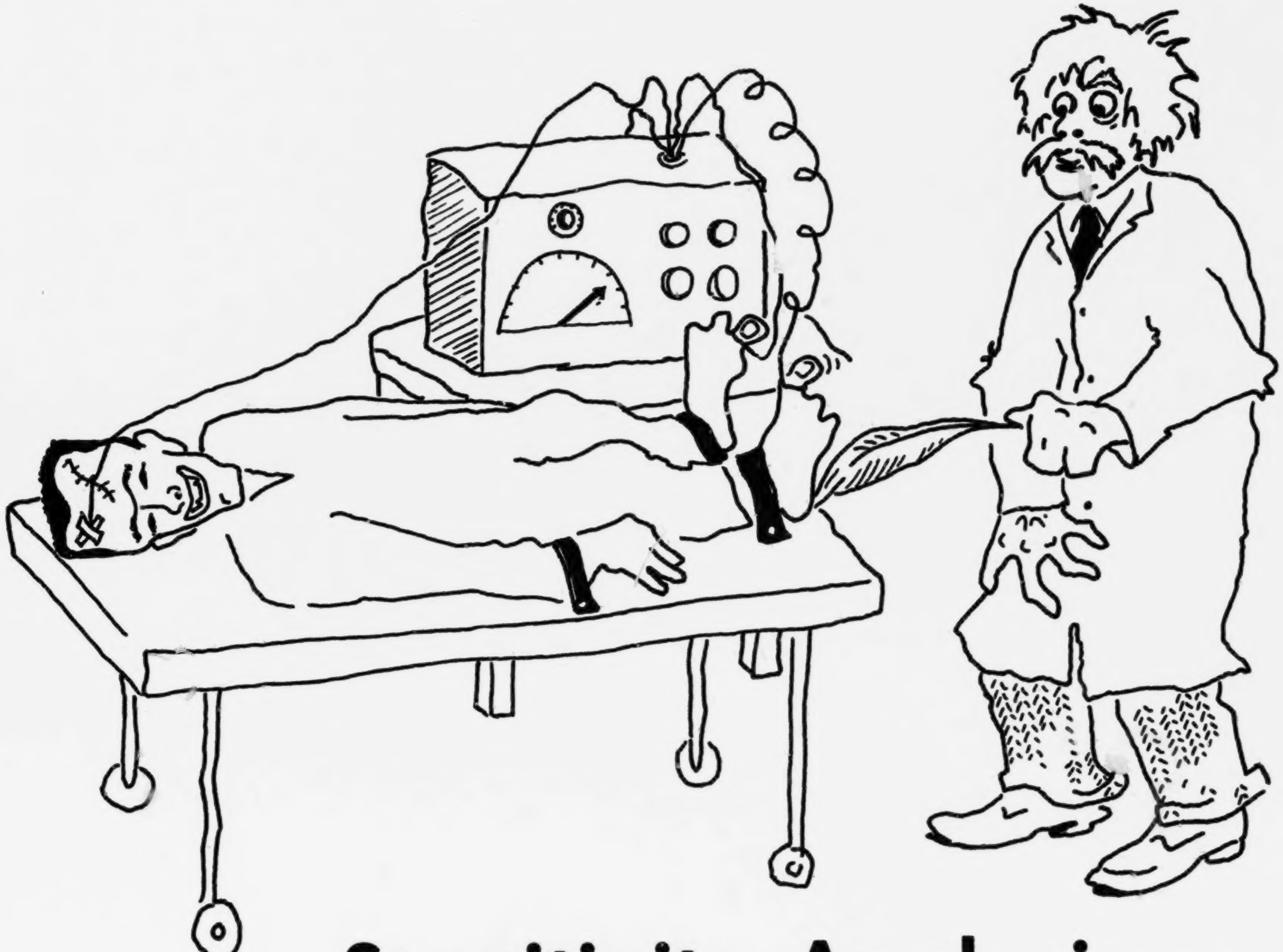
CRITERIA	EVALUATION MEASURES				
	BENEFITS	COST	TIME	CALCULATION	OTHER
6 UNDISCOUNTED BENEFIT-COST RATIO	CONSIDERS ALL MONEY BENEFITS	CONSIDERS ALL COSTS EXCEPT THE COST OF MONEY	EQUAL WEIGHT TO NEAR AND DISTANT RETURNS	EASY	
7 DISCOUNTED BENEFIT-COST RATIO	CONSIDERS ALL MONEY BENEFITS	CONSIDERS ALL COSTS	CONSIDERS TIME	DIFFICULT	RELATIVE PROFITABILITY
8 NET PRESENT VALUE	CONSIDERS ALL MONEY BENEFITS	CONSIDERS ALL COSTS	CONSIDERS TIME	DIFFICULT	ABSOLUTE PROFITABILITY
9 COST-UTILITY RATIO	CONSIDERS ALL BENEFITS	CONSIDERS ALL COSTS	CONSIDERS TIME	DIFFICULT	REQUIRES A UTILITY SCALE
10 COST-EFFECTIVENESS RATIO	IGNORES VALUE OF OUTPUT	CONSIDERS ALL COSTS	CONSIDERS TIME	DIFFICULT	VALID IF OUTPUTS ARE IDENTICAL IN TYPE AND QUALITY

CONSTRAINTS ON INVESTMENT CRITERIA

NET PRESENT VALUE	DISCOUNTED BENEFIT-COST RATIO	INTERNAL RATE OF RETURN
DIFFERENT INTEREST RATES. RESULT: DIFFERENT RANKINGS MAY OCCUR FOR EACH RATE.	DIFFERENT INTEREST RATES. RESULT: DIFFERENT RANKINGS MAY OCCUR FOR EACH RATE.	PROJECTS MUTUALLY EXCLUSIVE RESULT: ADOPTION OF A HIGH RATE OF RETURN. PROJECT MAY PRECLUDE MAXIMIZATION OF NET PRESENT VALUE.
PROJECT COSTS ARE LARGE RELATIVE TO AVAILABLE RESOURCES. RESULT: ADOPTION OF PROJECT MAY PRECLUDE ADOPTION OF TWO SMALLER PROJECTS WHOSE SUMMED PRESENT VALUE IS LARGER THAN THE ORIGINAL.	PROJECTS ARE MUTUALLY EXCLUSIVE. RESULT: ADOPTION OF A HIGH B-C PROJECT MAY PRECLUDE MAXIMIZATION OF NET PRESENT VALUE.	RELEVANT INTEREST RATE VARIES DURING LIFE OF PROJECT. RESULT: THE SINGLE COMPUTED RATE OF RETURN BECOMES IRRELEVANT.
BUDGET CONSTRAINTS. RESULT: SAME AS ABOVE.	BENEFIT INCREMENTS FROM ORIGINAL INVESTMENT ARE NOT IMMEDIATELY REINVESTED AT ORIGINAL INTEREST RATE. RESULT: NO MAXIMIZATION OF NET PRESENT VALUE.	BENEFIT INCREMENTS FROM ORIGINAL INVESTMENT ARE NOT IMMEDIATELY REINVESTED AT ORIGINAL RATE OF RETURN. RESULT: NO MAXIMIZATION OF NET PRESENT VALUE.
		MORE THAN ONE COST OUTLAY OCCURS OVER TIME. RESULT: MULTIPLE RATES OF RETURN NOT COMPUTED. NONE OF WHICH IS CORRECT. ALSO, COMPUTATION BECOMES EXTREMELY DIFFICULT.

GENERAL RULES:
1 IF BUDGET CONSTRAINT, USE BENEFIT-COST RATIO
2 IF NO BUDGET CONSTRAINT, USE NET PRESENT VALUE
3 FUNDAMENTAL OBJECTIVE: MAXIMIZATION OF NET PRESENT VALUE

SOURCE: J. KAUFMAN, E. STROMSDORFER, T. HU, AND M. LEE, *AN ANALYSIS OF THE COMPARATIVE COSTS AND BENEFITS OF VOCATIONAL VERSUS ACADEMIC EDUCATION IN SECONDARY SCHOOLS* (UNIVERSITY PARK: PENNSYLVANIA STATE UNIVERSITY, 1967), P. 54.



Sensitivity Analysis

SENSITIVITY ANALYSIS

DEFINITION: THE PROCESS OF TESTING EACH ELEMENT OF THE INVESTMENT MODEL (BENEFITS, COSTS, INTEREST RATE) TO DETERMINE WHICH ELEMENTS HAVE THE GREATEST IMPACT ON THE RESULTS OF THE INVESTMENT MODEL.

PROCEDURE: BENEFITS

VARY SIZE OF BENEFITS OVER TIME
VARY OCCURRENCE OF BENEFITS OVER TIME

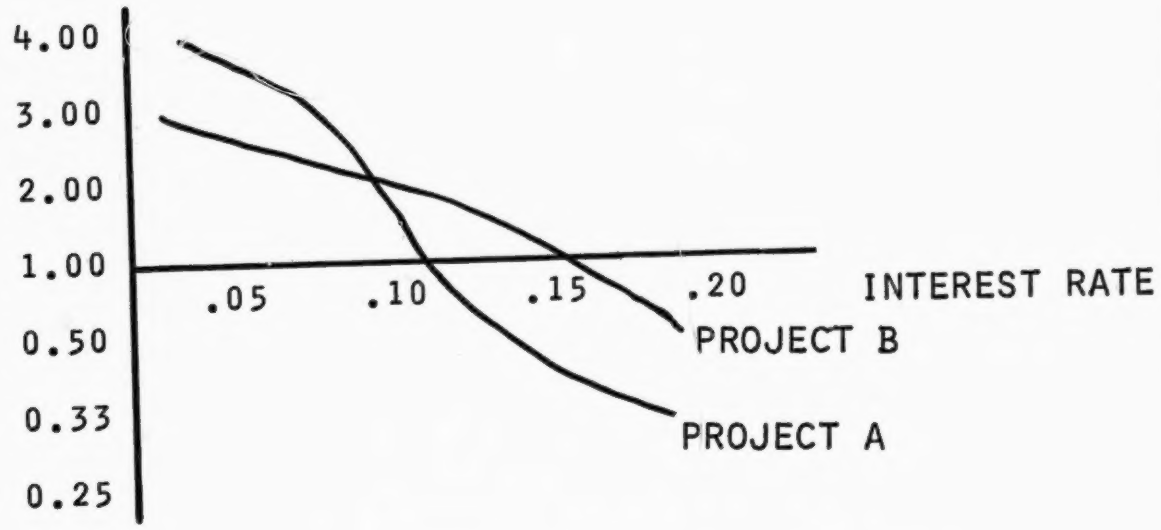
COSTS

VARY SIZE OF COSTS
VARY OCCURRENCE OF COSTS OVER TIME

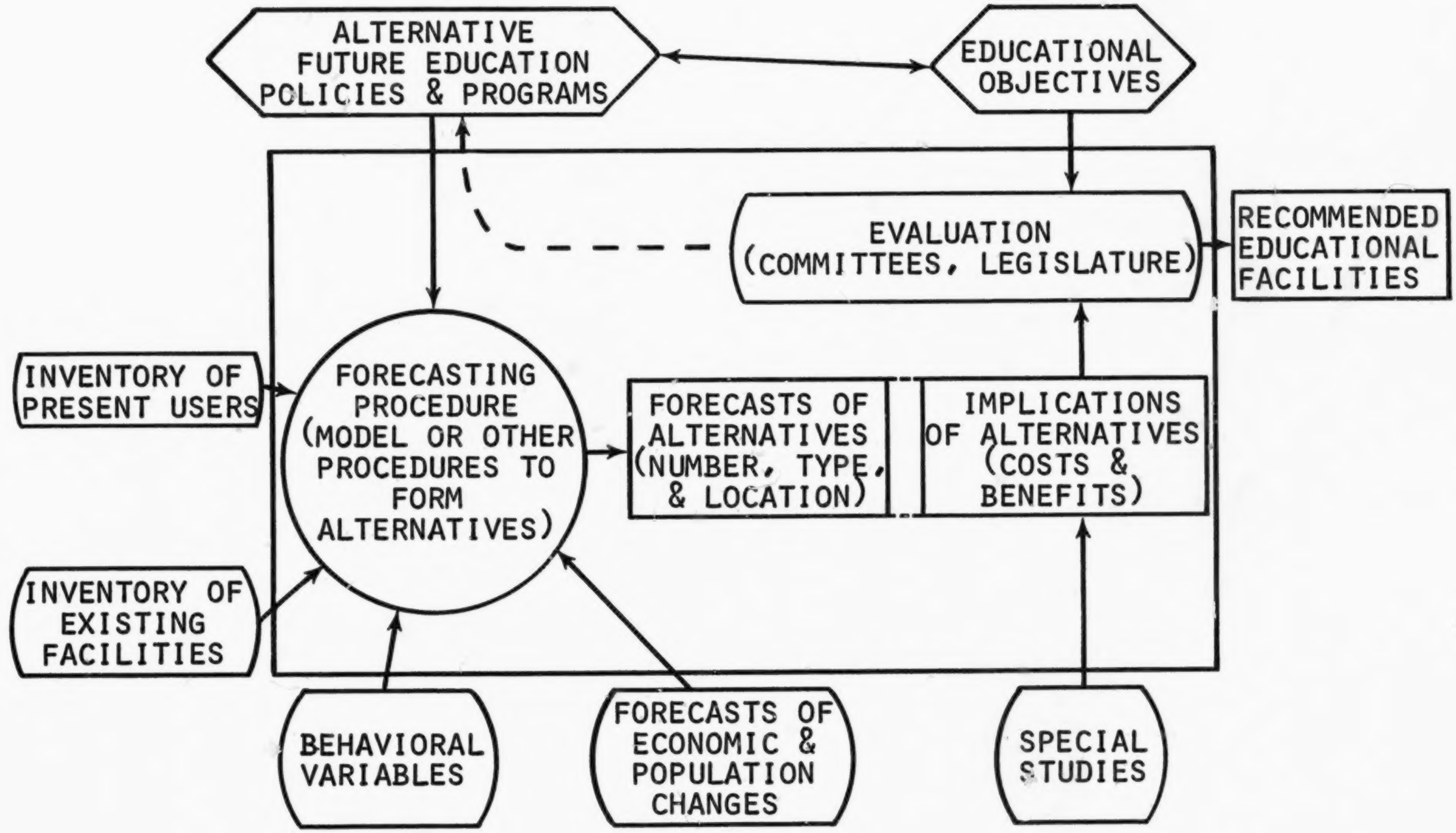
INTEREST RATE

VARY THE LEVEL OF THE INTEREST RATE
(THIS IS USUALLY THE MOST CRITICAL ELEMENT)

BENEFIT-COST RATIO



MODEL FOR ANALYSIS OF ALTERNATIVE FUTURE EDUCATIONAL FACILITIES


ALTERNATIVE FUTURE EDUCATION POLICIES & PROGRAMS
EDUCATIONAL OBJECTIVES
EVALUATION (COMMITTEES, LEGISLATURE)
RECOMMENDED EDUCATIONAL FACILITIES
INVENTORY OF PRESENT USERS
FORECASTING PROCEDURE (MODEL OR OTHER PROCEDURES TO FORM ALTERNATIVES)
FORECASTS OF ALTERNATIVES (NUMBER, TYPE, & LOCATION)
IMPLICATIONS OF ALTERNATIVES (COSTS & BENEFITS)
INVENTORY OF EXISTING FACILITIES
BEHAVIORAL VARIABLES
FORECASTS OF ECONOMIC & POPULATION CHANGES
SPECIAL STUDIES

SECTION 7

PROGRAMMING AND MANAGEMENT CONTROL

A. *Objective.* The objective of this section is to provide the learner with knowledge and skills related to programming and management control.

B. *Desired Outcomes.* If the general objective of this section has been achieved, the student should be able to:

1. Define the term budget and identify the three major purposes of the budget.
2. Differentiate between a program budget and a responsibility budget.
3. Describe management tasks required to integrate PPBS.
4. Define terms such as "budgeting," "reporting," "management of operations," and "programming."
5. Outline the guidelines for PPB systems.
6. Differentiate between expense and investment costs.
7. Define asset accounts.

C. *Prerequisite.* Satisfactory completion of the specific objectives outlined in Sections 3, 5, and 9.

D. *Placement of Section in Sequence.* The learners should be aware of the concepts presented in Sections 5 and 9 if this section is to be used independently of the component.

E. *Pre-evaluation.* The learner may be tested for proficiency on the specific objectives of Sections 1, 3, and 5 before being introduced to this section. Previous experience in accounting, budgeting, or systems analysis is helpful but not required.

F. *Minimum Time Estimate.* Approximately three to five hours should be devoted to the presentation of the basic concepts presented in this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Programming and Planning	133-135
2. Budgeting	

a. Purposes	136, 137
b. Types of Budgets	138-140
c. Organizational Structures	141, 142
3. Management Requirements	143
a. Terminology	144, 145
b. Process	146
4. Integration of PPBS	147
a. Budgeting	148-150
b. Accounting	151-155
5. Integrated Information Systems	156-157
6. PPBS Cycle	158

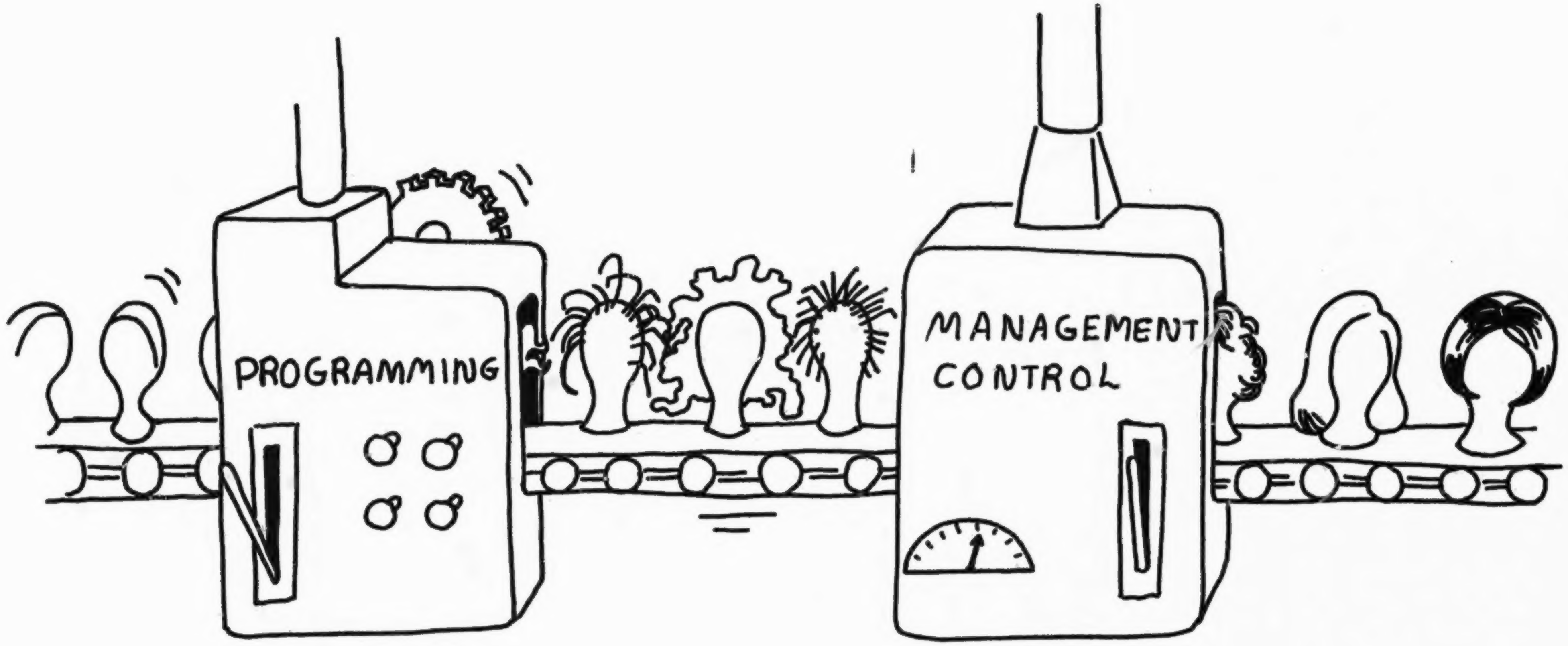
H. *Suggested Instructional Activities.*

1. Seminars utilizing budgets of different kinds of organizations may be conducted to help make more concrete the general objective of this section.
2. Analysis of actual organizational budgets may be conducted by the learner. The learner may present his findings to the seminar for a critique.
3. The learners may be asked to complete Step VII, Program Budget, in *Volume II: A Case Problem.*

I. *Reference Materials.*

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. R. N. Anthony, *Planning and Control Systems* (Cambridge: Harvard Graduate School of Business Administration, 1965).
4. R. N. Anthony and J. S. Hekiman, *Operations Cost Control* (Homewood, Illinois: Irwin, Inc., 1967).
5. U. S. Department of Defense, *A Primer on Project Prime* (The Pentagon: Washington, D. C., 1967).

J. *Instructional Aids*--pages 133 through 158.


PROGRAMMING
MANAGEMENT CONTROL

Programming and Management Control

PROGRAMMING AND MANAGEMENT CONTROL*

PROGRAMMING IN A PLANNING FRAMEWORK

SO FAR, WE HAVE DISCUSSED PROGRAMMING IN A PLANNING FRAMEWORK--THE LINK BETWEEN BUDGETING AND PLANNING IN TERMS OF PUBLIC POLICY DEVELOPMENT AND ENACTMENT. ACCORDINGLY, PROGRAMMING WAS TREATED AS A USEFUL AID IN SYSTEMATICALLY IDENTIFYING THE OBJECTIVES OF PUBLIC POLICY AND A DETERMINATION OF THE RESOURCES REQUIRED TO MEET THOSE OBJECTIVES. IN SUCH A CONTEXT, PROGRAMMING POSSESSED CERTAIN CHARACTERISTICS:

> IT WAS ORGANIZED INTO MEANINGFUL CLASSIFICATIONS, WITH A MINIMUM TIME FRAME OF FIVE YEARS.
>
> IT WAS COMPREHENSIVE IN THAT IT REFLECTED THE TOTAL COST OF THE PROGRAM ANNUALLY OVER FIVE YEARS.
>
> IT WAS SPECIFIC WITH REGARD TO EXPECTED INPUTS AND OUTPUTS OF PROGRAM CATEGORIES AND PROGRAM ELEMENTS.
>
> IT REFLECTED DECISIONS ALREADY MADE BY POLICY MAKERS WITH CONSEQUENCES OVER AT LEAST FIVE YEARS.
>
> IT UTILIZED ANALYTICAL TOOLS (COST-EFFECTIVENESS) IN ALLOCATING HUMAN AND MATERIAL RESOURCES.
>
> IT PROVIDED SUMMARY REPORTING FOR MANAGEMENT (POLICY DEVELOPMENT) USE.

---

*ADAPTED FROM DEPARTMENT OF DEFENSE, *A PRIMER ON PROJECT PRIME*, WASHINGTON D. C., 1967.

PROGRAMMING AND MANAGEMENT CONTROL

PROGRAMMING WITHIN THE PLANNING FRAMEWORK WAS NOT OF MAXIMUM USE TO THE OPERATING MANAGER BECAUSE:

THE ELEMENTS OF THE PROGRAM STRUCTURE WERE NOT NECESSARILY LINKED TO THE ORGANIZATIONAL STRUCTURE OR TO THE APPROPRIATION STRUCTURE.

NO DISTINCTION WAS MADE BETWEEN INDEPENDENT PROGRAMS AND DEPENDENT PROGRAMS WHICH ARE DEPENDENT ON THE SIZE AND CHARACTER OF INDEPENDENT PROGRAMS.

NO DISTINCTION WAS MADE BETWEEN CAPITAL COSTS AND OPERATING COSTS EACH OF WHICH IS ACTUALLY MANAGED DIFFERENTLY.

LITTLE DISTINCTION WAS MADE BETWEEN EXPENSES AND INVESTMENT; THE FORMER BEING RELATED TO RESULTS OBTAINED WITHIN A GIVEN TIME FRAME AND HENCE A MORE VALID BASIS FOR PERFORMANCE EVALUATION, AND THE LATTER BEING AN INVENTORY ITEM OR PURCHASE WHICH IS CONSUMED OR USED UP OVER SEVERAL EXPENSE TIME FRAMES.

THE PROGRAM WAS NOT NECESSARILY TIED TO BUDGETING, ACCOUNTING AND "REAL" MANAGEMENT.

TO CLOSE THE GAP BETWEEN PLANNED PROGRAMS AND PROGRAM IMPLEMENTATION IT IS IMPERATIVE THAT AN INTEGRATED STRUCTURE BE ESTABLISHED WHICH LINKS UP THE PLANNING, PROGRAMMING, BUDGETING, ACCOUNTING AND MANAGEMENT (PPBAM) LOOPS.

PROGRAMMING AND MANAGEMENT CONTROL

MULTIPURPOSE BUDGETING REQUIREMENTS

DEFINITION: THE BUDGET IS THE PLAN OF AN ORGANIZATION EXPRESSED IN QUANTITATIVE TERMS. IN GOVERNMENT THERE IS NO SUBSTITUTE FOR THE BUDGET AS THE CENTRAL FINANCIAL APPARATUS: THUS MOST THINGS WITH FINANCIAL IMPLICATIONS ARE HARNESSED TO IT. TO MEET THE DEMANDS OF AN INTEGRATED PLANNING, PROGRAMMING, BUDGETING SYSTEM, THE BUDGET MUST SERVE THREE PURPOSES:

CONTROL:	THE NEED TO LIMIT THE EXECUTIVE'S AUTHORITY TO SPEND.
MANAGEMENT:	THE NEED TO EFFECTIVELY AND EFFICIENTLY MANAGE HUMAN AND MATERIAL RESOURCES.
PLANNING:	THE NEED TO DEVELOP AND ENACT PUBLIC POLICY ON A MORE RATIONAL BASIS WHICH PERMITS CHOICES BETWEEN COMPLEMENTARY AND SUBSTITUTIVE POLICIES.

HISTORICALLY MOST GOVERNMENTAL BUDGETING HAS BEEN CONCERNED WITH CONTROL:

THIS MEANT THAT ONE UNIFORM SET OF ACCOUNTS EXISTED WHICH TIED APPROPRIATIONS TO OBJECTS (INPUTS) AND TO ORGANIZATIONAL CLASSIFICATION.

IT ALSO MEANT THAT THE MANAGEMENT AND PLANNING FUNCTIONS WERE NEGLECTED.

(CONT.)

IN THE 1940'S AND 1950'S MORE ATTENTION WAS GIVEN TO THE MANAGEMENT ASPECTS OF BUDGETING BUT THE CONTROL ASPECTS WERE STILL EMPHASIZED.

THE MANAGEMENT ASPECTS WERE EXPRESSED IN TERMS OF PERFORMANCE BUDGETING (THE NOTION THAT AN ACTIVITY COULD BE MADE MORE EFFICIENT).

THE CONTROL ASPECT REMAINED DOMINANT BECAUSE OF THE LACK OF A "REAL" MANAGEMENT BASE AND THE FACT THAT AN "ACTIVITY" USUALLY TRANSCENDED ORGANIZATIONAL BOUNDS.

IN THE 1960'S THE PLANNING ASPECTS OF BUDGETING RECEIVED INCREASINGLY MORE ATTENTION AT THE FEDERAL AND STATE LEVELS (DEPARTMENT OF DEFENSE, WISCONSIN). THIS REQUIRED YET ANOTHER INFORMATIONAL SYSTEM FOR PLANNING, WHICH WAS (AND IS) LABELLED PPBS.

TO FULLY IMPLEMENT A PPBAM SYSTEM WILL REQUIRE SPECIALIZED, OR INTERFACED, INFORMATION SYSTEMS FOR:

PLANNING--THE ESTABLISHMENT OF POLICY AND OBJECTIVES

MANAGEMENT--DIRECTING AND MEASURING PROGRESS TOWARD GOAL ACHIEVEMENT

CONTROL--LIMITING THE EXECUTIVE'S AUTHORITY TO SPEND

CONTROL BUDGET

STATE VOCATIONAL BOARD			(2,607,000)
STATE ADMINISTRATION		100,000	
PERSONNEL SERVICES	60,000		
MATERIALS AND EXPENSE	30,000		
CAPITAL OUTLAY	10,000		
SCHOLARSHIPS		2,000	
FEDERAL REIMBURSEMENT		1,000,000	
REVOLVING FUNDS		5,000	
SCHOOL AIDS		1,500,000	

PERFORMANCE BUDGET

STATE VOCATIONAL BOARD			(2,607,000)
ADMINISTRATION			
STATE VOCATIONAL BOARD--STATE ADMINISTRATION	100,000		
ADMINISTRATION	20,000		
AGRICULTURE	20,000		
BUSINESS EDUCATION	10,000		
DISTRIBUTIVE EDUCATION	10,000		
HOME ECONOMIC EDUCATION	20,000		
TRADE & INDUSTRIAL EDUCATION	10,000		
TECHNICAL EDUCATION	10,000		

NO. _____ SUPERVISORY VISITS PER MAN YEAR
NO. _____ EVALUATION CONFERENCES PER MAN YEAR
NO. _____ CURRICULUM REVISIONS PER MAN YEAR
ETC.

SCHOLARSHIPS	2,000
SCHOOL AIDS	1,500,000
REVOLVING FUNDS	5,000
FEDERAL AIDS	1,000,000

ASSUMPTIONS: A STATUTORY AID FORMULA EXISTS

A MEASURE OF STUDENTS, STAFF OR VALUATION PER PUPIL SUPPORTS AID CATEGORY

FEDERAL AIDS ARE EXPENDED IN ACCORD WITH FEDERAL POLICY

PROGRAM BUDGET

VOCATIONAL, TECHNICAL AND ADULT EDUCATION FOR YOUTH AND ADULTS (2,607,000)

AIDS TO VTA SCHOOLS	(2,400,000)
SECONDARY SCHOOL YOUTH	500,000
ADULTS IN FULL-TIME P.H.S. PROGRAMS	300,000
UNEMPLOYED YOUTH AND ADULTS	400,000
ADULTS PART-TIME TO UPGRADE	100,000
ADULTS WITH SPECIAL NEEDS	300,000
CONSTRUCTION OF FACILITIES	700,000
STAFF SERVICES TO SCHOOLS	(205,000)
SPECIAL PROJECTS (R & D)	(100,000)
AIDS TO INDIVIDUALS IN VTA SCHOOLS	(2,000)

ASSUMPTIONS:

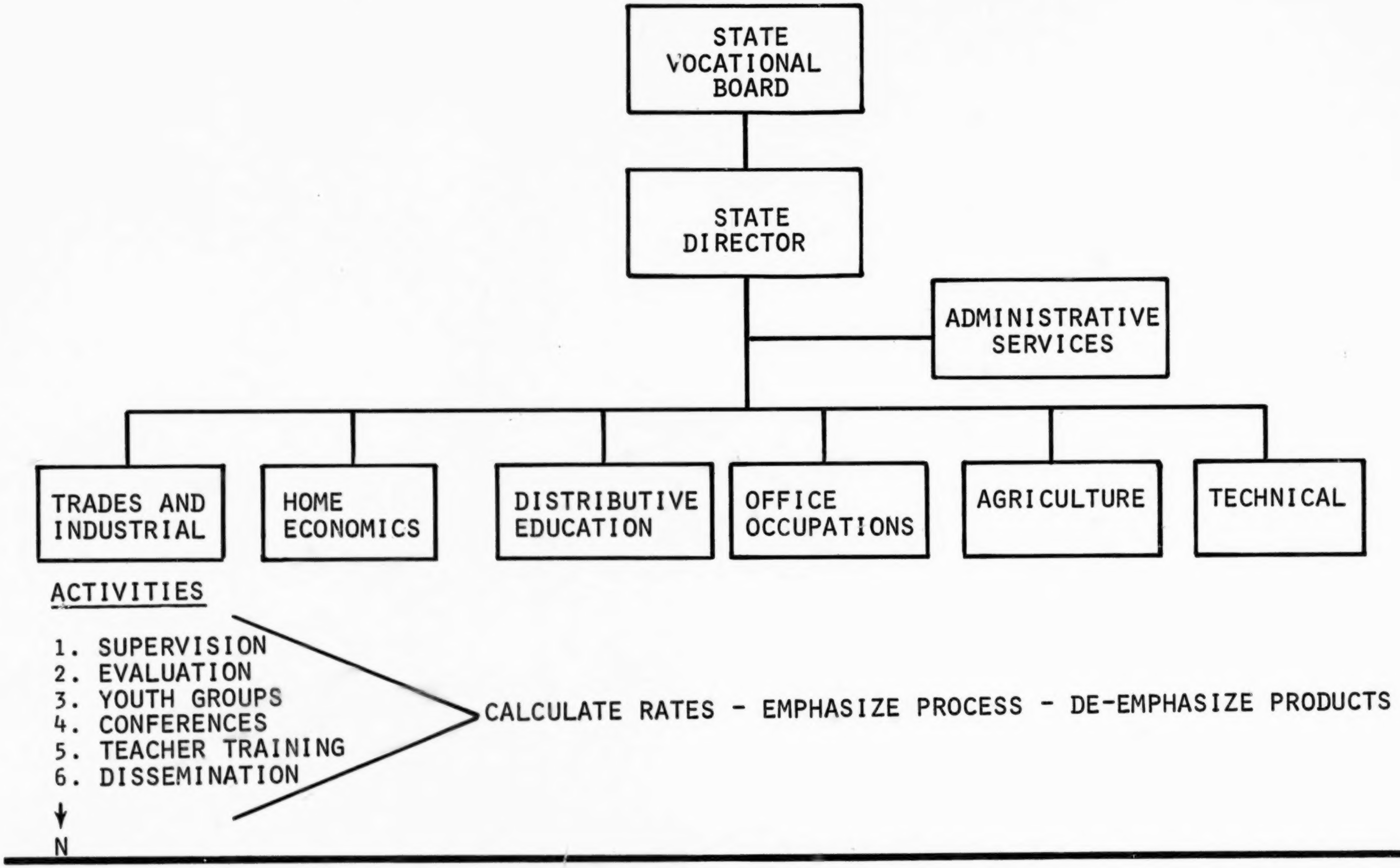
ACTUAL AND ESTIMATED ENROLLMENTS OVER A 10-YEAR TIME FRAME BY PROGRAM CATEGORIES IS POSSIBLE

ACTUAL AND ESTIMATED FACULTY OVER 10 YEARS BY PROGRAM IS POSSIBLE

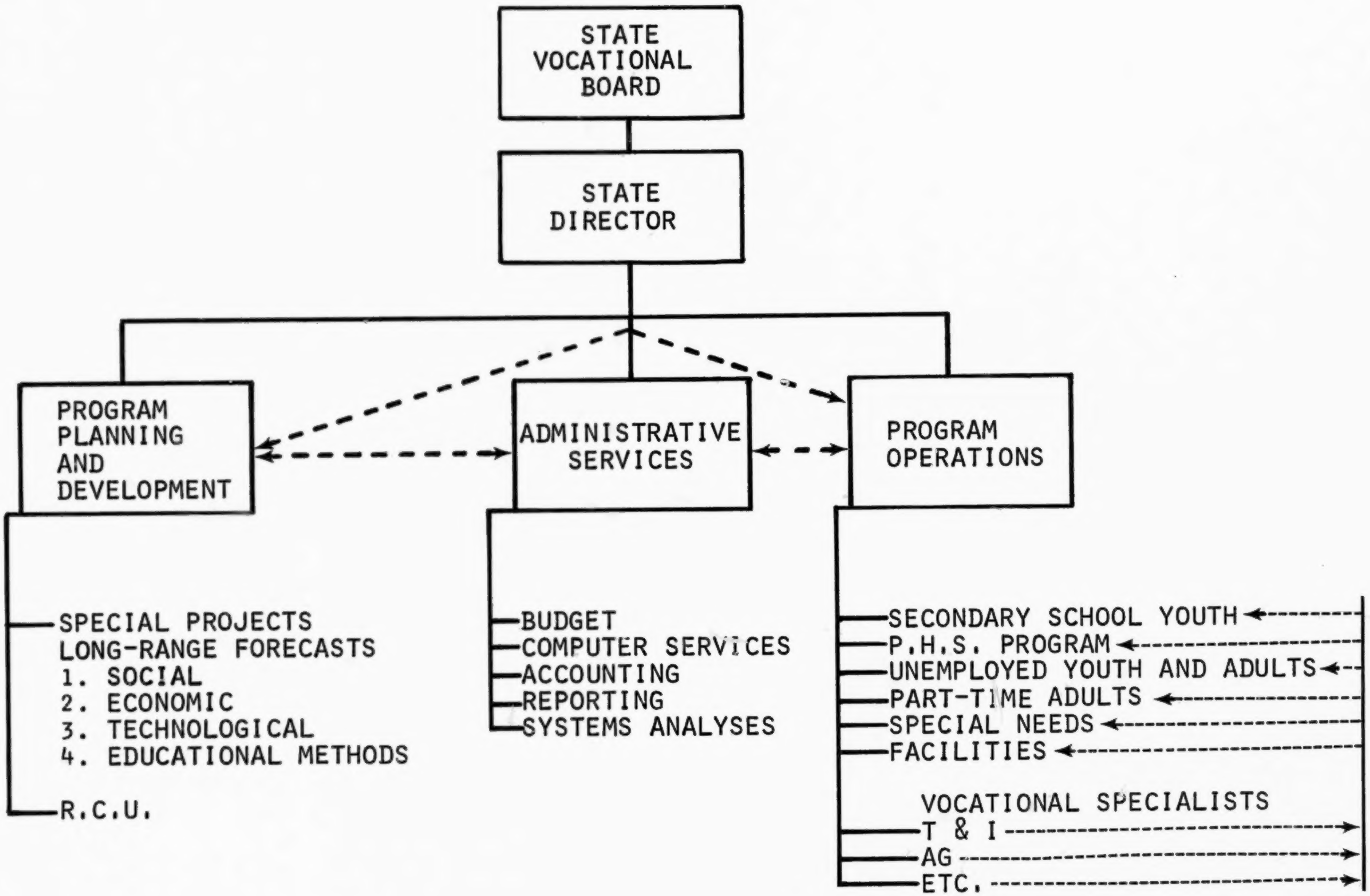
ACTUAL AND ESTIMATED STATE, LOCAL AND FEDERAL AIDS BY PROGRAM IS POSSIBLE

ACTUAL AND ESTIMATED SPACE REQUIREMENTS BY PROGRAM AND/OR BY SCHOOL IS POSSIBLE

CONCEPTUALIZATION OF A STATE DEPARTMENT'S (SDVE) ORGANIZATIONAL STRUCTURE FOR "CONTROL" AND "PERFORMANCE" BUDGETING


STATE VOCATIONAL BOARD
STATE DIRECTOR
ADMINISTRATIVE SERVICES
TRADES AND INDUSTRIAL
HOME ECONOMICS
DISTRIBUTIVE EDUCATION
OFFICE OCCUPATIONS
AGRICULTURE
TECHNICAL
ACTIVITIES
1. SUPERVISION
2. EVALUATION
3. YOUTH GROUPS
4. CONFERENCES
5. TEACHER TRAINING
6. DISSEMINATION
N
CALCULATE RATES - EMPHASIZE PROCESS - DE-EMPHASIZE PRODUCTS

CONCEPTUALIZATION OF A STATE DEPARTMENT'S (SDVE) ORGANIZATIONAL STRUCTURE FOR "PROGRAM" BUDGETING


STATE VOCATIONAL BOARD
STATE DIRECTOR
PROGRAM PLANNING AND DEVELOPMENT
ADMINISTRATIVE SERVICES
PROGRAM OPERATIONS
SPECIAL PROJECTS
LONG-RANGE FORECASTS
1. SOCIAL
2. ECONOMIC
3. TECHNOLOGICAL
4. EDUCATIONAL METHODS
R.C.U.
BUDGET
COMPUTER SERVICES
ACCOUNTING
REPORTING
SYSTEMS ANALYSES
SECONDARY SCHOOL YOUTH
P.H.S. PROGRAM
UNEMPLOYED YOUTH AND ADULTS
PART-TIME ADULTS
SPECIAL NEEDS
FACILITIES
VOCATIONAL SPECIALISTS
T & I
AG
ETC.

MANAGEMENT REQUIREMENTS TO INTEGRATE PLANNING, PROGRAMMING, BUDGETING AND ACCOUNTING SYSTEMS

TO FORMULATE PROGRAMS SYSTEMATICALLY INCLUDING A DEFINITION OF ALTERNATIVES AND SELECTION OF THE BEST ALTERNATIVE.

TO TRANSLATE PROGRAMS INTO BUDGETS IN AN INTEGRATED, CONSISTENT FASHION--REQUIRING THAT THEY BE EXPRESSED IN SIMILAR TERMS.

TO SPECIFY RESPONSIBILITY FOR A MISSION OR SERVICE IN TERMS OF ORGANIZATIONAL UNITS.

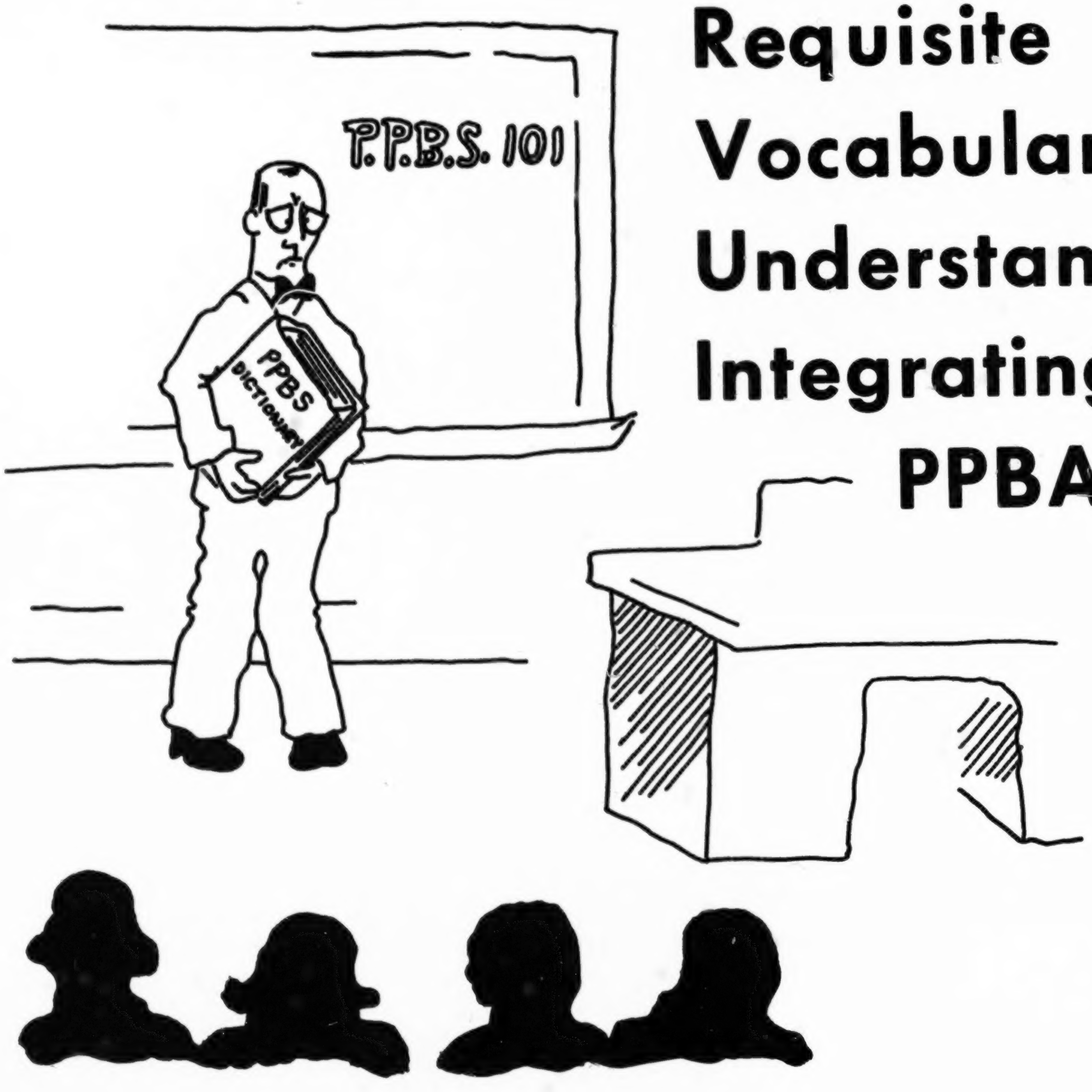
TO MEASURE ACTUAL PERFORMANCE AGAINST PLANNED PERFORMANCE (EFFECTIVENESS).

TO RELATE RESOURCES CONSUMED TO WORK DONE (EFFICIENCY).

TO PROVIDE RECURRING, QUANTITATIVE INFORMATION REGARDING ACTUAL RESULTS OF ACTIVITIES TO MANAGERS AT APPROPRIATE LEVELS.

TO PROVIDE RELIABILITY AND CONSISTENT ACCURACY IN THE DATA.

Requisite Vocabulary for Understanding and Integrating the PPBAM System


P.P.B.S. 101
PPBS DICTIONARY

REQUISITE VOCABULARY FOR UNDERSTANDING AND INTEGRATING THE PPBAM SYSTEM

PROGRAMMING

SETTING GOALS, OBJECTIVES AND SCHEDULES FOR ACHIEVING THEM, COLLECTING FUNCTIONS AND ACTIVITIES SHARING THE SAME OBJECTIVE IN FAMILIES (PROGRAMS), AND ESTIMATING RESOURCE REQUIREMENTS FOR EACH.

BUDGETING

FORMULATING DETAILED PROJECTIONS OF RESOURCE REQUIREMENTS FOR THE PROGRAMS, OBTAINING AND ALLOCATING ASSOCIATED FUNDS, AND BALANCING PRIORITIES IN THE COMPETITION FOR LIMITED RESOURCES.

ACCOUNTING

MEASURING RESULTS AND STATUS, USUALLY IN FINANCIAL TERMS, FOR BOTH ORGANIZATIONAL UNITS AND FUNCTIONAL AREAS.

REPORTING

TRANSMITTING FINANCIAL AND NON-FINANCIAL INFORMATION ON STATUS AND RESULTS OF OPERATIONS AND INVESTMENTS TO APPROPRIATE LEVELS OF MANAGEMENT.

AUDITING

REVIEWING THE ACCURACY OF REPORTED RESULTS AND JUDGING THE ACCURACY OF AND COMPLIANCE WITH ESTABLISHED POLICIES AND PROCEDURES.

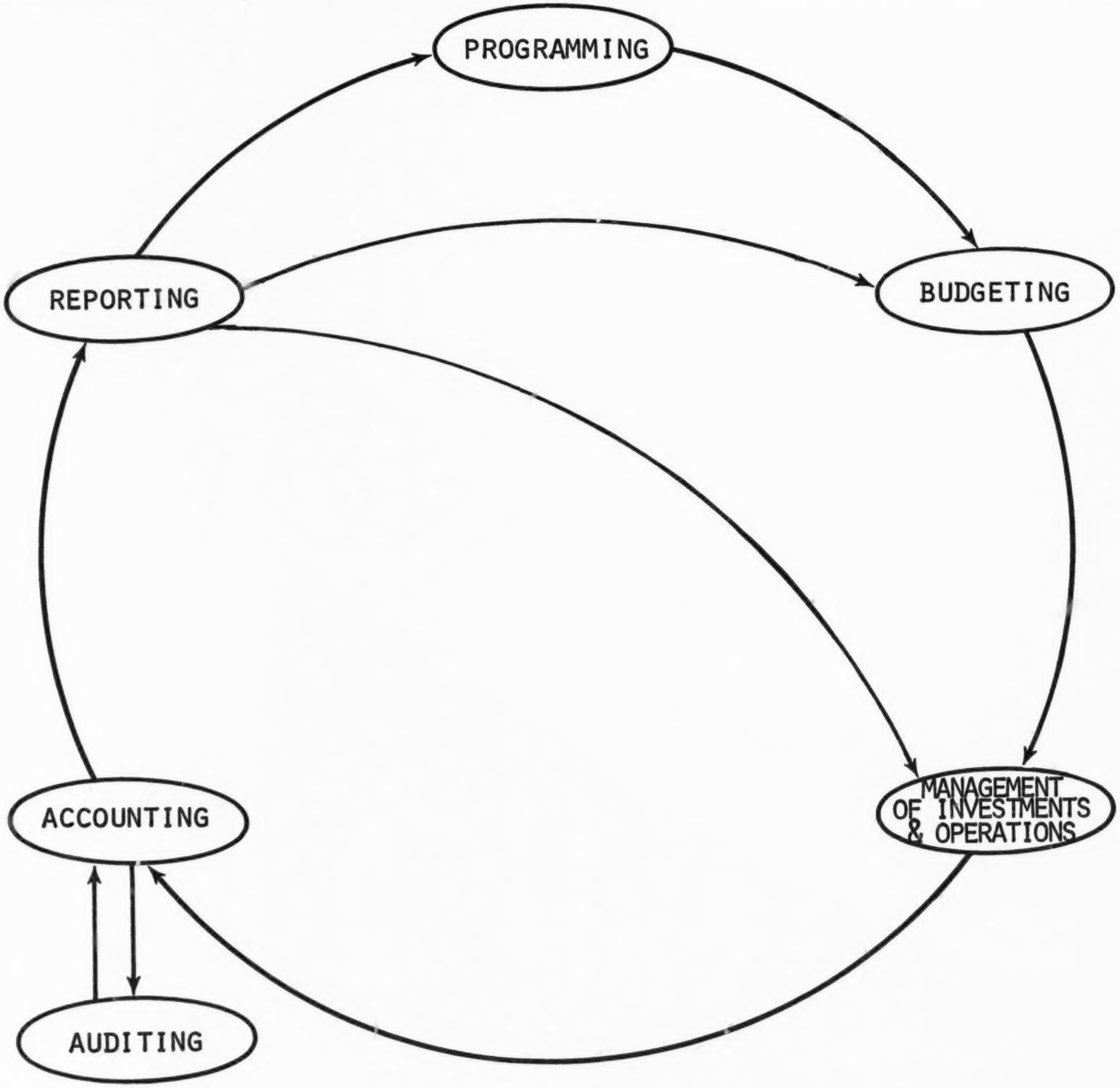
MANAGEMENT OF INVESTMENTS

ADMINISTERING THE ACQUISITION AND USE OF THOSE GOODS AND SERVICES WHICH REPRESENT MAJOR END ITEMS.

MANAGEMENT OF OPERATIONS

ADMINISTERING THE ACQUISITION OF CONSUMABLE RESOURCES AND THEIR CONSUMPTION IN THE EXECUTION OF ASSIGNED MISSIONS (OBJECTIVES).

DOD
MANAGEMENT
PROCESS


PROGRAMMING
BUDGETING
MANAGEMENT OF INVESTMENTS & OPERATIONS
ACCOUNTING
AUDITING
REPORTING

GUIDELINES FOR ESTABLISHING INTEGRATED PLANNING, PROGRAMMING, BUDGETING AND ACCOUNTING SYSTEMS

MAJOR PROGRAMS

THE BASIC PROGRAM STRUCTURE SHOULD BE ORGANIZED TO DISTINGUISH CLEARLY AT THE MAJOR PROGRAM LEVELS BETWEEN ACTIVITIES DIRECTLY RELATED TO THE EDUCATIONAL EFFORT AND ACTIVITIES WHOSE SIZE AND RESOURCES ARE ESSENTIALLY DEPENDENT ON THE SIZE AND POSITION OF THE INDEPENDENT ACTIVITIES.

PROGRAM ELEMENTS

A PARALLEL EFFORT SHOULD BE MADE AT A GREATER LEVEL OF DETAIL TO DEFINE PROGRAM ELEMENTS IN TERMS OF THE SMALLEST COST COLLECTION UNIT POSSIBLE IN THE MAJOR PROGRAMMATIC SENSE.

INDEPENDENT AND DEPENDENT PROGRAM ELEMENTS

THIS DISTINCTION SHOULD BE ANALOGOUS TO THE DISTINCTION IN MAJOR PROGRAMS (ABOVE). INDEPENDENT PROGRAMS ARE CHARGED WITH COSTS OF SERVICES WHICH ARE RELATABLE AND MEASURABLE AND OBTAINED FROM SERVICE UNITS, IN ADDITION TO THE COST ROUTINELY AND DIRECTLY CHARGEABLE TO THE INDEPENDENT PROGRAM. SERVICE PROGRAM ELEMENTS (DEPENDENT PROGRAMS) ARE CHARGED WITH ONLY THOSE COSTS WHICH ARE NOT CHARGED TO MISSION ELEMENTS AS PAYING CUSTOMERS.

COSTING

AGGREGATIONS OF OPERATING COSTS SHOULD BE IN TERMS OF ORGANIZATIONAL ENTITIES. INVESTMENT COSTS (PROCUREMENT AND CONSTRUCTION) SHOULD BE AGGREGATED IN TERMS OF THE ITEM OR CLASS OF ITEM BEING PROCURED OR CONSTRUCTED. THESE WILL BE PRORATED TO PROGRAM ELEMENTS ON A CONSUMPTION OR USED UP BASIS.

LOCATION OF ELEMENTS

A PROGRAM ELEMENT IS ASSIGNED TO THE MAJOR PROGRAM TO WHICH THE TOTAL OF ITS OUTPUT CAN MOST REASONABLY BE ASSOCIATED IN TERMS OF THE OBJECTIVE SERVED: DEPENDENT ELEMENTS RELATING TO TWO OR MORE ELEMENTS WITHIN A SINGLE PROGRAM SHOULD BE LOCATED DIRECTLY BELOW THE GROUP OF ELEMENTS TO WHICH THEY RELATE.

MANAGEMENT CONTROL--BUDGETING

PRINCIPLES OF BUDGETING

IT SHOULD BE SPONSORED BY MANAGEMENT AND VIEWED AS A TOOL OF MANAGEMENT AND NOT PRIMARILY AS A CONTROL DEVICE.

THE RESPONSIBILITY BUDGET SHOULD BE BUILT UP BY RESPONSIBILITY CENTERS AND SHOULD SHOW SEPARATELY THE CONTROLLABLE COSTS IN EACH RESPONSIBILITY CENTER.

RESPONSIBLE SUPERVISORS SHOULD PARTICIPATE IN THE PROCESS AND SHOULD AGREE THAT BUDGET GOALS ARE REASONABLE.

RESPONSIBLE SUPERVISORS MUST UNDERSTAND THE BUDGET PROCESS, WHICH REQUIRES CONTINUOUS EDUCATION.

THE TIME PERIOD COVERED BY ONE BUDGET SHOULD BE RELATED TO THE NECESSITY FOR AND THE POSSIBILITY OF EFFECTIVE MANAGEMENT ACTION.

THE PLANNED FIGURES IN THE RESPONSIBILITY BUDGET SHOULD MATCH (IN DEFINITION) THE ACCOUNTING FIGURES THAT REPORT ACTUAL PERFORMANCE.

THE BUDGET FIGURES SHOULD REPRESENT REASONABLY ATTAINABLE GOALS.

THE BUDGET SYSTEMS SHOULD NOT COST MORE TO OPERATE THAN IT IS WORTH.

THE STAFF FUNCTION OF FACILITATING THE PROCESS SHOULD NOT BE CONFUSED WITH THE LINE FUNCTION WHICH IS TO MAKE DECISIONS; THE BUDGET STAFF ASSISTS THE LINE ORGANIZATION.

THE REVIEW BY SUCCESSIVELY HIGHER LEVELS OF MANAGEMENT SHOULD BE THOROUGH.

FINAL APPROVAL SHOULD BE SPECIFIC, AND THIS APPROVAL SHOULD BE COMMUNICATED TO THE ORGANIZATION.

MANAGEMENT CONTROL--BUDGETING

TYPES OF BUDGETS

OPERATING BUDGETS USUALLY CONSIST OF TWO PARTS: 1) A PROGRAM BUDGET AND 2) A RESPONSIBILITY BUDGET.

A PROGRAM BUDGET DESCRIBES THE MAJOR PROGRAMS AN AGENCY UNDERTAKES; IT MIGHT BE ARRANGED BY SERVICES FOR CERTAIN CLIENTELE GROUPS AND WOULD SHOW THE INPUTS AND OUTPUTS, THE COSTS AND BENEFITS RELATED TO THE PROGRAM.

A RESPONSIBILITY BUDGET SETS FORTH PLANS IN TERMS OF THE PERSONS AND ORGANIZATIONAL ENTITIES RESPONSIBLE FOR CARRYING THEM OUT. IT IS THEREFORE PRIMARILY A CONTROL DEVICE SINCE IT IS A STATEMENT OF EXPECTED OR STANDARD PERFORMANCE AGAINST WHICH ACTUAL PERFORMANCE CAN LATER BE COMPARED.

OPERATING BUDGETS AND STANDARD COSTS

AN OPERATING BUDGET AND STANDARD COSTS BOTH TRY TO ESTABLISH A BENCHMARK FOR PERFORMANCE EVALUATION. COSTS CAN BE ESTIMATED AND BUDGETED EVEN THOUGH SOME COSTS ARE:

VARIABLE WITH VOLUME (I.E. MATERIAL, LABOR AND SUPPLIES)

SOMEWHAT VARIABLE WITH VOLUME (SUPERVISION, INDIRECT LABOR)

FIXED (DEPRECIATION AND ALLOCATED COSTS)

CONTROLLABLE (SUPERVISION, SUPPLIES, ETC.)

UNCONTROLLABLE (DEPRECIATION, ALLOCATED COSTS)

MANAGEMENT CONTROL--BUDGETING

USES OF THE OPERATING BUDGET

TO DEVELOP, COORDINATE AND IMPLEMENT A PLAN

TO IMPROVE COMMUNICATION WITHIN AND BETWEEN THE SUBSYSTEMS INVOLVED

TO STIMULATE MOTIVATION ON THE PART OF THE LOWEST LEVEL MANAGER BECAUSE IT CAN BE REGARDED AS A SORT OF TWO-WAY CONTRACT BETWEEN TOP MANAGEMENT AND THE LOWEST LEVEL OF SUPERVISION

TO SERVE AND ESTABLISH A STANDARD BY WHICH ACTUAL PERFORMANCE CAN BE MEASURED

SIMILARITY OF THE OPERATING BUDGET TO THE FLIGHT FOR EACH AIRPLANE FLIGHT

THE FLIGHT PLAN IS A WRITTEN DOCUMENT. IT IS PREPARED IN ADVANCE BY THE CAPTAIN, THE PERSON WHO IS RESPONSIBLE FOR THE FLIGHT.

IT IS PREPARED WITHIN THE FRAMEWORK OF DECISIONS MADE BY HIGHER AUTHORITY.

THE CAPTAIN DESCRIBES HOW HE PLANS TO ACCOMPLISH THE OBJECT (ALTITUDE AND ROUTE) AND THE ESTIMATED COST (GAS USE AND TIME).

THE METEOROLOGIST, A STAFF MAN, HAS FURNISHED DATA THAT HELPS THE CAPTAIN PLAN, BUT THE CAPTAIN IS RESPONSIBLE.

THE CAPTAIN SIGNS THE PLAN REFLECTING HIS RESPONSIBILITY FOR IT.

THE DISPATCHER INITIALS THE PLAN INDICATING MANAGEMENT SUPPORT FOR THE PLAN.

THE PLAN ITSELF DOES NOT FLY THE PLANE. LIKEWISE, THE BUDGET DOES NOT SUBSTITUTE FOR MANAGEMENT, BUT IS AN AID TO MANAGEMENT.

MANAGEMENT CONTROL--ACCOUNTING

HISTORICALLY THE FOCUS OF ACCOUNTING HAS BEEN ON THE SOURCE, APPLICATION, AND STATUS OF APPROPRIATED FUNDS:

SOURCE:	WHERE DID THE MONEY COME FROM? APPROPRIATION? GOODS OR SERVICES SOLD? INTERFUND TRANSFERS? ETC.?
APPLICATION:	WHAT INPUTS WERE BOUGHT? PERSONNEL? MATERIALS AND SUPPLIES? CAPITAL EQUIPMENT? ETC.?
STATUS:	HOW DO ALLOTTED FUNDS COMPARE WITH FUNDS APPROPRIATED? IS THERE A SURPLUS, A DEFICIT? ETC.?

EXISTING ACCOUNTING SYSTEMS (FORMAL) MAKE NO ATTEMPT TO ACCOUNT FOR THE COST OF RESOURCES ACTUALLY USED AND WHILE "COST ACCOUNTING" SYSTEMS EXIST, THEY ARE RARELY TIED IN WITH BASIC APPROPRIATION ACCOUNTING SYSTEMS. HENCE, THE TOTAL COSTS OF A PROGRAM (IN THE TERMS IN WHICH PROGRAM DECISIONS ARE MADE) CAN (AT BEST) ONLY BE ESTIMATED.

> BUDGET STRUCTURES FOR PERSONNEL SERVICES RELATE TO TYPES OF SALARY AND PAY RATHER THAN PROGRAM CATEGORIES.
>
> BUDGET STRUCTURES FOR EXPENSE AND CAPITAL GOODS RELATE TO WHAT IS BOUGHT RATHER THAN PROGRAM.
>
> EXPENSE AND CAPITAL OR INVESTMENT COSTS ARE INTERMINGLED; THUS IT IS DIFFICULT TO DETERMINE ACTUAL COSTS INCURRED OR USED UP DURING A GIVEN TIME PERIOD.

TO IMPROVE AND INTEGRATE ACCOUNTING AND REPORTING WITH PROGRAMMING, BUDGETING AND MANAGEMENT CONTROL FOUR MAJOR REQUIREMENTS MUST BE MET:

PERSONNEL COSTS SHOULD BE CHARGED NOT ONLY TO ORGANIZATIONAL OR RESPONSIBLE UNITS, BUT ALSO TO PROGRAM CATEGORIES AND PROGRAM ELEMENTS IN WHICH THE PERSONNEL WORK.

APPROPRIATIONS SHOULD BE PURIFIED TO PERMIT A BREAKOUT BETWEEN EXPENSE ITEMS AND INVESTMENT ITEMS.

IN CONCERT WITH THE ABOVE REQUIREMENT, ASSET ACCOUNTS (WHICH HOLD INVENTORY IN SUSPENSE FROM THE TIME THEY ARE ORDERED UNTIL THEY ARE RECEIVED BY THE FINAL USER) SHOULD BE ESTABLISHED SO THAT OPERATING EXPENSE ACCOUNTS REFLECT ONLY THE EXPENSE OF ITEMS CONSUMED, AND NOT THE COST OF ITEMS ACQUIRED BUT NOT YET CONSUMED.

A UNIFORM ACCOUNT STRUCTURE FOR EXPENSE ITEMS SHOULD BE ESTABLISHED SO THAT ACCOUNTING INFORMATION IS COLLECTED IN WAYS THAT ARE USEFUL NOT ONLY FOR CONTROL OF THE SOURCE, APPLICATION AND STATUS OF FUNDS, BUT ALSO USEFUL TO THE OPERATING MANAGER AS WELL AS THE PLANNING, PROGRAMMING AND BUDGETING FUNCTIONS OF THE ORGANIZATION, AND ITS RELEVANT SUPERORDINATE SUBSYSTEMS.

COSTING OF PERSONNEL

ALL SERVICES (COST OF) SHOULD BE CHARGED TO AN ORGANIZATIONAL UNIT (RESPONSIBILITY CENTER).

ALL SERVICES SHOULD BE CHARGED TO A PROGRAM, PROJECT, AND/OR FUNCTION IN ACCORD WITH THE ACTUAL PERFORMANCE OF DUTIES.

CLARIFICATION OF EXPENSE AND INVESTMENT COSTS

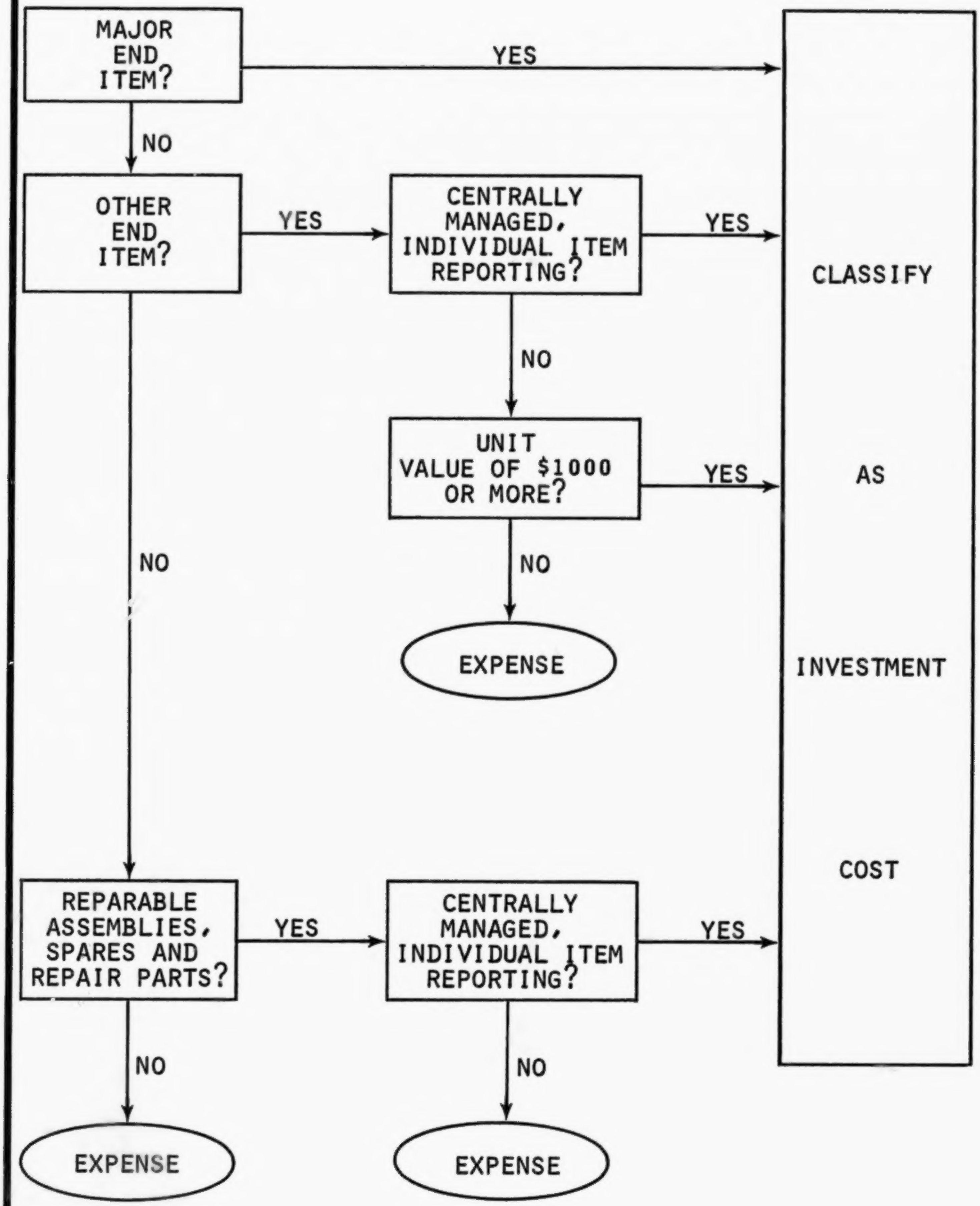
EXPENSES CONTRIBUTE TO THE CURRENT SUPPORT OF AN ACTIVITY; THEY ARE CONSUMED WITHIN A GIVEN TIME FRAME.

1. LABOR COSTS
2. END ITEMS OF EQUIPMENT HAVING A UNIT VALUE OF LESS THAN $1,000
3. NONREPARABLE SPARES AND REPAIR PARTS
4. REPAIR PARTS NOT CENTRALLY INVENTORIED AND/OR MANAGED AND DESIGNATED NONREPARABLE BY MANAGEMENT
5. ALL ITEMS ISSUED FROM WORKING CAPITAL INVENTORIES TO THE MOST LIKELY END USE POINT
6. MAINTENANCE, RENTAL PAYMENTS FOR LEASED EQUIPMENT, ETC.

INVESTMENT COSTS ARE RELATED TO THE ACQUISITION OF EQUIPMENT AND REAL PROPERTY; THEY GIVE RISE TO LONG LIVED ASSETS FROM WHICH BENEFITS ACCRUE OVER LONG TIME FRAMES.

1. MAJOR END ITEMS OF EQUIPMENT
2. OTHER END ITEMS OF EQUIPMENT COSTING MORE THAN $1,000 NOT INCLUDED IN THE ABOVE ITEM
3. INVENTORY ITEMS WHICH ARE REPARABLE AND USUALLY CENTRALLY MANAGED.
4. CONSTRUCTION WHICH INCLUDES THE COST OF LAND AND RIGHTS

INVESTMENT COST DECISION DIAGRAM


MAJOR END ITEM?
YES
NO
OTHER END ITEM?
YES
CENTRALLY MANAGED, INDIVIDUAL ITEM REPORTING?
YES
NO
UNIT VALUE OF $1000 OR MORE?
YES
NO
EXPENSE
NO
CLASSIFY AS INVESTMENT COST
REPARABLE ASSEMBLIES, SPARES AND REPAIR PARTS?
YES
CENTRALLY MANAGED, INDIVIDUAL ITEM REPORTING?
YES
NO
EXPENSE
NO
EXPENSE

ASSET ACCOUNTS: THE DEVICE WHICH ACCOUNTS FOR THE EXPENDITURE OF FUNDS FORM THE TIME THEY ARE ORDERED UNTIL THE TIME THEY ARE FINALLY USED.

THERE IS OFTEN A DIFFERENCE IN THE TIME, PLACE, AND PERSONAL RESPONSIBILITY BETWEEN THE PURCHASE OF A RESOURCE AND ITS CONSUMPTION.

THE ASSUMPTION IS THAT THE MANAGEMENT OF OPERATING RESOURCES SHOULD FOCUS ON THE JOB TO BE DONE, THE PERSON (THE MANAGER) WHO IS RESPONSIBLE FOR DOING THE JOB, AND THE COMMITMENT OF COST.

THERE ARE TWO USEFUL TYPES OF ASSET ACCOUNTS:

1 STOCK: WHICH ARE USED TO HOLD THE COST OF MATERIALS IN SUSPENSE UNTIL USED.

2 INDUSTRIAL: WHICH ARE USED TO HOLD IN SUSPENSE MANUFACTURED AND SERVICE ITEMS PRODUCED WITHIN THE AGENCY.

AN ILLUSTRATION OF THE FUNCTIONING OF STOCK AND INDUSTRIAL ACCOUNTS FOLLOWS:

1 A PURCHASING OFFICER IN A LARGE VOCATIONAL-TECHNICAL DISTRICT IS RESPONSIBLE FOR PROCUREMENT; A MANAGER OF A TECHNICAL HIGH SCHOOL IS RESPONSIBLE FOR CONSUMPTION; OTHER MANAGERS ARE RESPONSIBLE FOR MAINTAINING ADEQUATE (BUT NOT EXCESS) INVENTORY.

2 A SUPPLY ITEM IS PURCHASED IN 1967, BUT NOT CONSUMED UNTIL 1968.

3 THE VENDOR MUST BE PAID WHEN THE ITEM IS BOUGHT.

4 WITHOUT ASSET ACCOUNTS, THE ITEM WOULD BE PAID FOR IN 1967; HELD IN THE WAREHOUSE UNTIL USED IN 1968; THE V-T MANAGER WOULD GET THE ASSET ON A "FREE" BASIS AND THUS NOT WORRY ABOUT THE ITEM AS MUCH AS HE WOULD AN ITEM FOR WHICH HE IS DIRECTLY ACCOUNTABLE.

5 WITH ASSET ACCOUNTS, THE ITEM IS ACQUIRED; HELD IN SUSPENSE; AND CHARGED TO THE FINAL USER WHEN HE USES IT.

6 WITH ASSET ACCOUNTS THE AVAILABILITY OF "FREE" ASSETS IS DECREASED AND THE PROPORTION OF OVERHEAD COSTS IS DIMINISHED. THE MANAGER IS MOTIVATED TO GIVE EQUAL CONSIDERATION TO ALL RESOURCES CONSUMED.

INTEGRATED INFORMATION SYSTEMS

INTEGRATED INFORMATION SYSTEMS SHOULD BE DIRECTLY RELATED TO THE MANAGEMENT FUNCTIONS OF PLANNING, IMPLEMENTATION AND EVALUATION.

PLANNING--THE NEEDS OF THE FORECAST POPULATION ARE ESTABLISHED AND THE RESOURCES REQUIRED ARE DETERMINED AND PRESENTED IN DEPARTMENTAL PLANS AND BUDGETS (SEE PLANNING PROCESS POLICY BASE AND NEEDS).

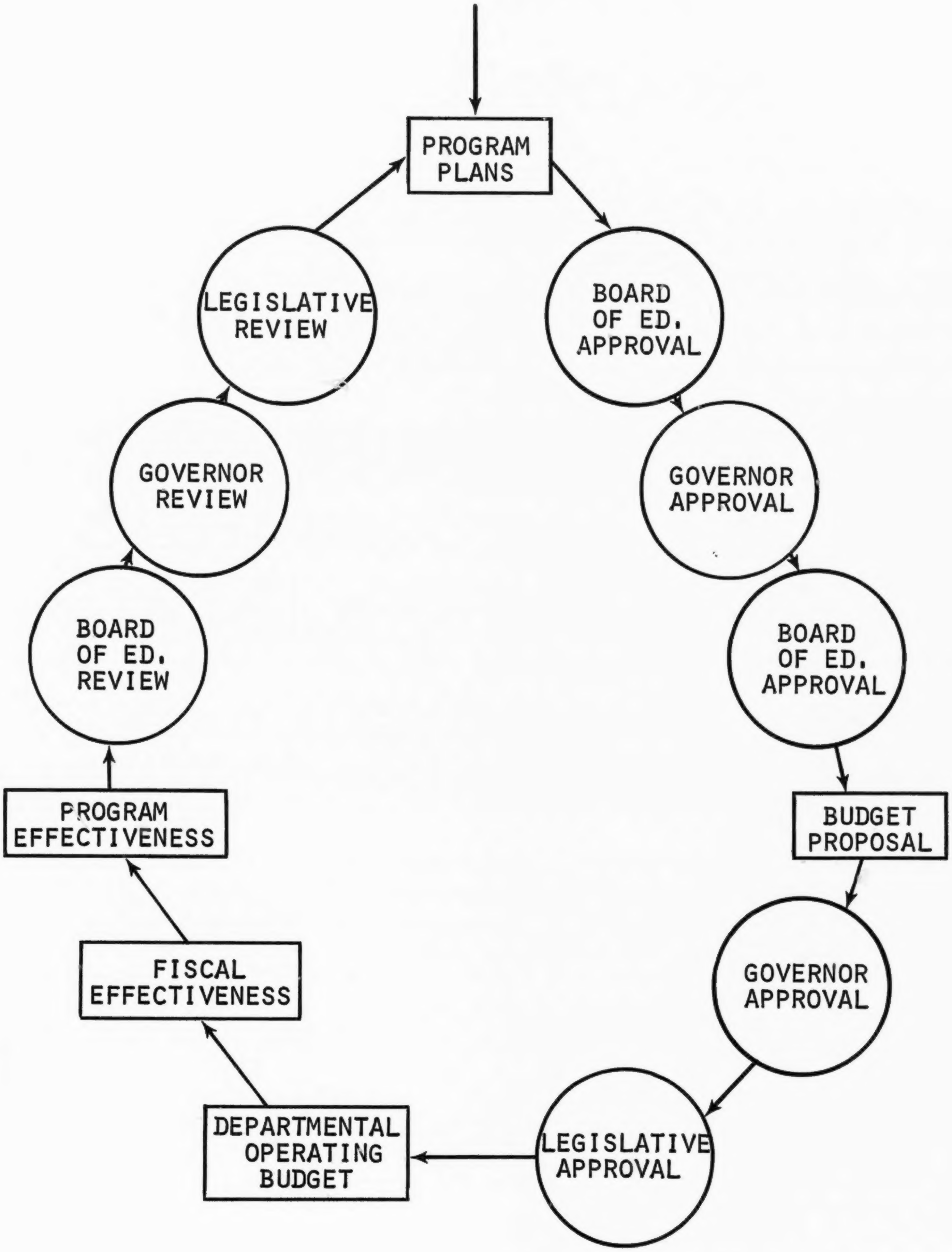
IMPLEMENTATION--RESULTS IN PROVIDING SERVICE TO AN INDIVIDUAL AND GROUPS OF INDIVIDUALS.

EVALUATION--PROVIDES INFORMATION ON WHETHER THE SERVICES RENDERED HAVE ACCOMPLISHED THE GOALS ESTABLISHED FOR THE INDIVIDUAL AND THE PROGRAM.

RELATIONSHIP OF MANAGEMENT'S INFORMATION NEEDS TO THE BASIC MANAGEMENT FUNCTIONS

MANAGEMENT INFORMATION NEEDS	BASIC MANAGEMENT FUNCTIONS		
	PLANNING	IMPLEMENTATION	EVALUATION
ABOUT OBJECTIVES AND GOALS	CLEAR AND SPECIFIC STATEMENTS OF PURPOSE (GOALS) AND LONG- AND SHORT-RANGE OBJECTIVES (IMPLYING TARGET DATES)	CLEAR AND SPECIFIC STATEMENTS OF PURPOSE (GOALS) AND LONG- AND SHORT-RANGE OBJECTIVES (IMPLYING TARGET DATES)	PERIODIC REASSESSMENT OF THE ADEQUACY OF GOAL STATEMENTS TO EXPRESS PURPOSE AND SERVE AS GUIDES TO PLAN, IMPLEMENT, AND EVALUATE PROGRAMS
ABOUT THE POPULATION BEING OR TO BE SERVED AND THEIR EDUCATIONAL NEEDS	FORECASTS OF STUDENTS TO BE SERVED AND KINDS OF SERVICES REQUIRED--BASED UPON INDIVIDUAL AND GROUP PLANS	INFORMATION DESCRIBING WHAT IS OCCURRING AND COMPARING ACTUAL TO PLAN	INFORMATION INDICATING WHETHER OBJECTIVES AND GOALS ARE BEING MET
ABOUT RESOURCES--STAFF--FACILITIES--EQUIPMENT--SUPPLIES--FUNDS--COMMUNITY--PROGRAMS	STANDARDS AND OTHER PLANNING CRITERIA AVAILABILITY OF VARIOUS KINDS OF RESOURCES AND STATUS OF FUNDS	INFORMATION DESCRIBING HOW RESOURCES ARE BEING UTILIZED AND COMPARISON OF ACTUAL TO PLAN	COST-BENEFIT ANALYSIS INDICATING WHETHER THE MOST EFFECTIVE USE OF RESOURCES IS OCCURRING

POLICY CYCLE


PROGRAM PLANS
BOARD OF ED. APPROVAL
GOVERNOR APPROVAL
BOARD OF ED. APPROVAL
BUDGET PROPOSAL
GOVERNOR APPROVAL
LEGISLATIVE APPROVAL
DEPARTMENTAL OPERATING BUDGET
FISCAL EFFECTIVENESS
PROGRAM EFFECTIVENESS
BOARD OF ED. REVIEW
GOVERNOR REVIEW
LEGISLATIVE REVIEW

SECTION 8

BASIC DATA FOR PPBS

A. *Objective.* The objective of this section is to provide the learner with an overview of the general knowledge required to understand the data requirements to undertake PPB analysis.

B. *Desired Outcomes.* If the general objective of this section has been achieved the learner should be able to:

1. Construct a course offering form containing the basic course information requested in his district.
2. Explain the actual and conceptual interrelationships between student-teacher-course-program.
3. Construct a course numbering system capable of handling over 100 courses.
4. Construct a student information form sufficient to permit a student to register in the learner's district.
5. Develop a generalized flow chart of the student registration procedure in the learner's district.
6. Describe at least eight by-products which flow from a computerized student/staff accounting system.

C. *Prerequisite.* Satisfactory completion of the objectives of Sections 1, 2, 5, and 6. Some experience in student-staff or fiscal accounting would be desirable but not absolutely necessary.

D. *Placement of Section in Sequence.* While this section may be used independently, it is suggested that it be used after Section 6 in this program.

E. *Pre-evaluation.* The learner may be tested on his proficiency in meeting the specific objectives of Section 6.

F. *Minimum Time Estimate.* No less than one hour in lecture-discussion would be required to adequately develop this topic. Moreover, it is recommended that a resource person skilled in student, staff, fiscal, etc., data systems be consulted *before* this topic is given.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Basic Data	161
a. Course Information	162, 163
b. Student Information	164

2. Registration Procedure	165-168
3. Annual Reporting Procedure	
a. Enrollment	169
b. Teacher Load and Cost	170, 171

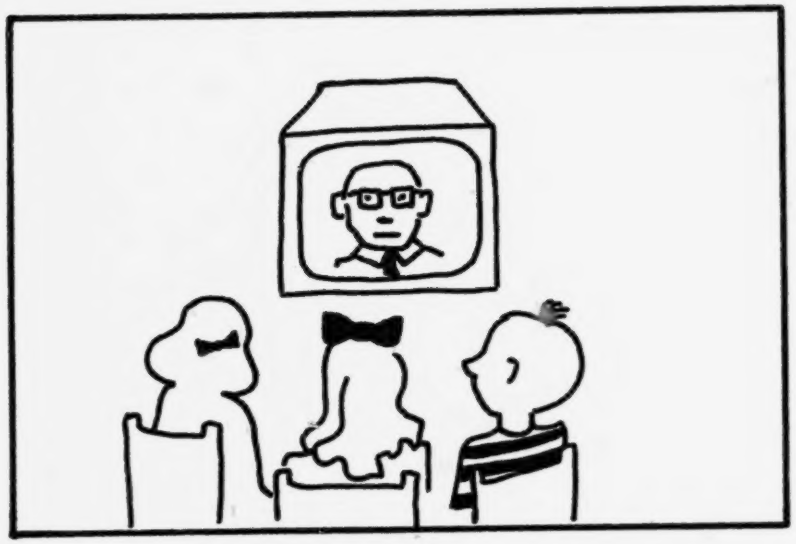
H. *Instructional Activities.*

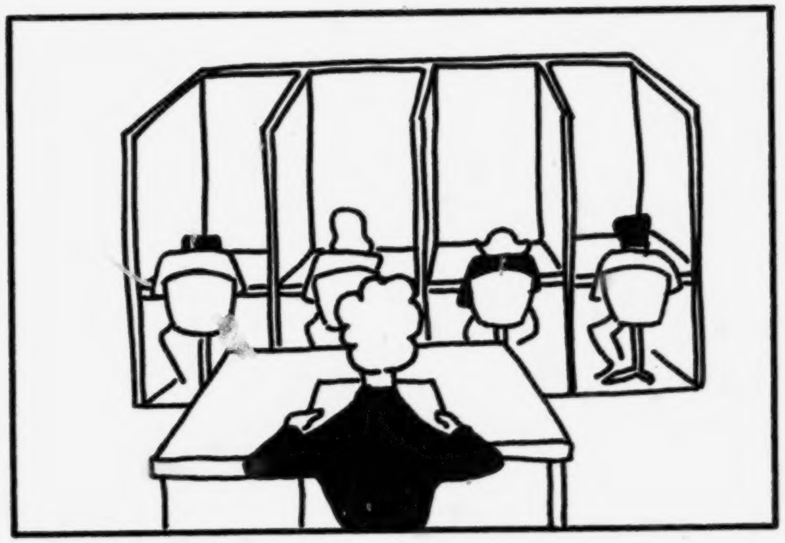
1. The learners may be divided into small groups to develop course numbering systems capable of handling a large number of courses, organizational systems, clientele variations, etc.
2. The learners may critique the student staff systems of existing districts.
3. The learners may be asked to stipulate the student, staff, course, program, fiscal, data, which is useful and necessary to PPB systems.
4. The learners may be asked to arrange the data stipulated above, on an easy to obtain--difficult to obtain continum.

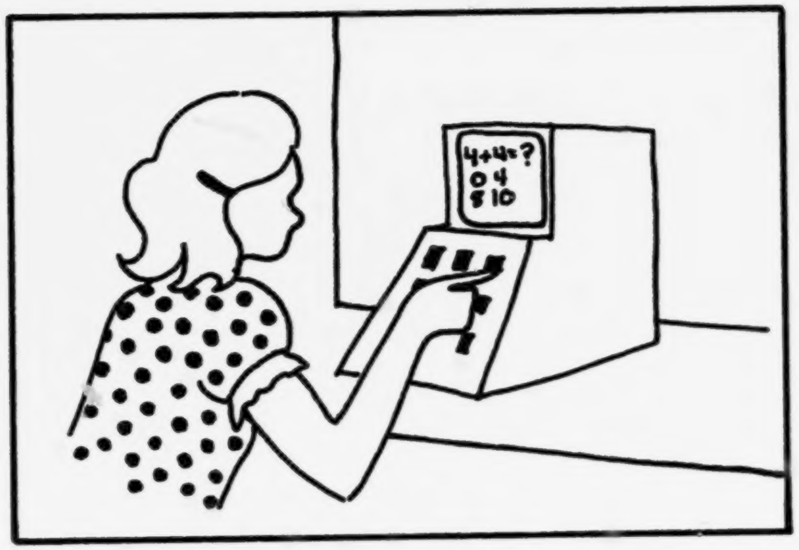
I. *Reference Material.* The following references may be used to develop and increase the learner's skills and knowledge in this area.

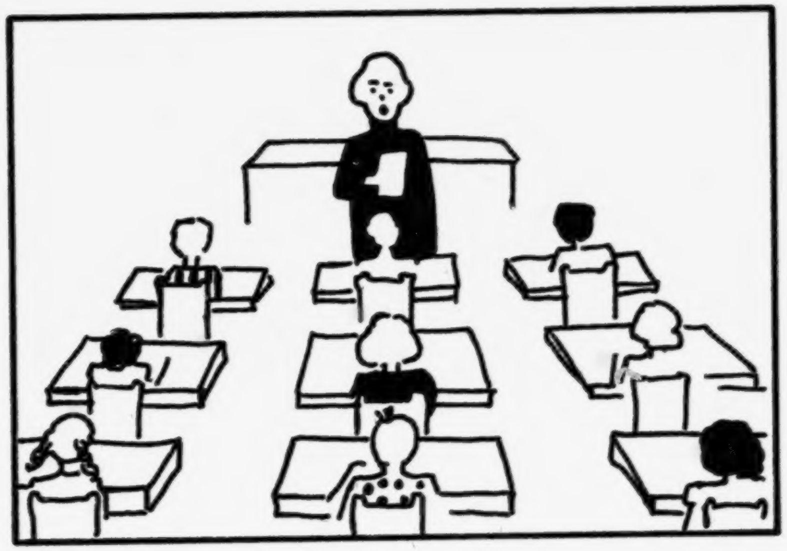
1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. R. S. Kaimann and R. W. Markee, *Educational Data Processing: New Dimensions and Prospects* (Boston: Houghton Mifflin Co., 1967).
4. U. S. Department of Health, Education and Welfare, *State Educational Records and Reports Series: Handbooks One Through Eight* (Washington, D. C.: Department of Health, Education and Welfare).

J. *Instructional Aids*--pages 161 through 171.









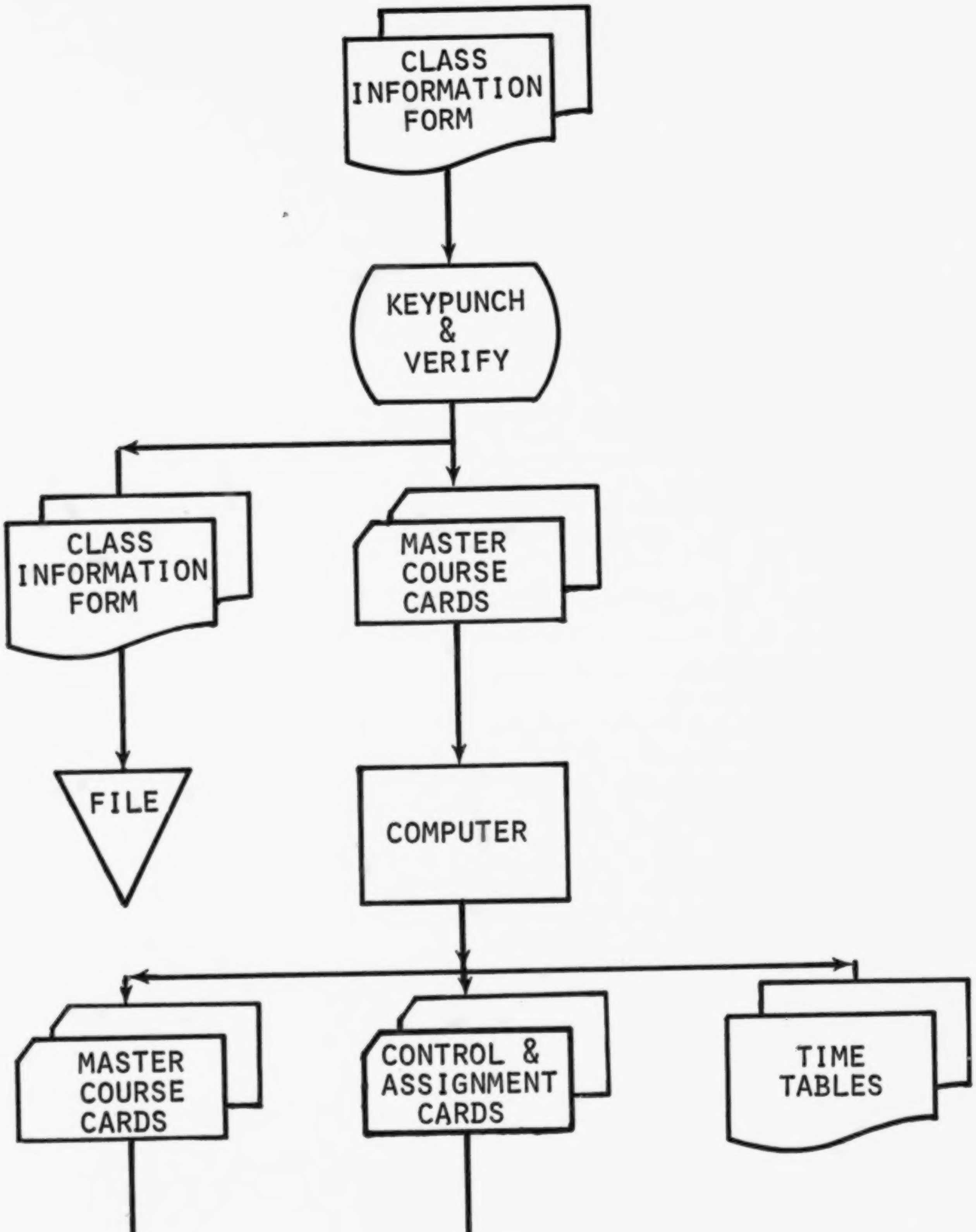
Basic Data for PPBS -
Student, Teacher and Course

COURSE OFFERING FORM

CHECK:
SEM 1 ☐, SEM 2 ☐, SUMMER ☐, DAY ☐, EVE ☐ DATE_____ DEPT_____ PAGE_____ OF_____

(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)		(10)	(11)
NO.OF HRS.OR PERS.PER SEM.COUR. TAUGHT	COURSE TITLE (18 SPACES MAXIMUM)	FOR OFFICE USE	SE-QUENCE (MAX. NO.OF STUD.)	COURSE FEE	CRED. OR COUR. VALUE	TOTAL HRS. OR PER. PER WEEK		INSTRUCTOR LAST FIRST MIDDLE	TIME OF MEETING		RM.NO. OR PLACE OF MTG.	COURSE NUMBER (8 DIGITS)
						HR.	PER.		DAYS	TIME		

CONTROL AND ASSIGNMENT CARDS


CLASS INFORMATION FORM
KEYPUNCH & VERIFY
CLASS INFORMATION FORM
MASTER COURSE CARDS
FILE
COMPUTER
MASTER COURSE CARDS
CONTROL & ASSIGNMENT CARDS
TIME TABLES
FILE
CARDS ARE DISTR. TO REGISTRATION PTS.

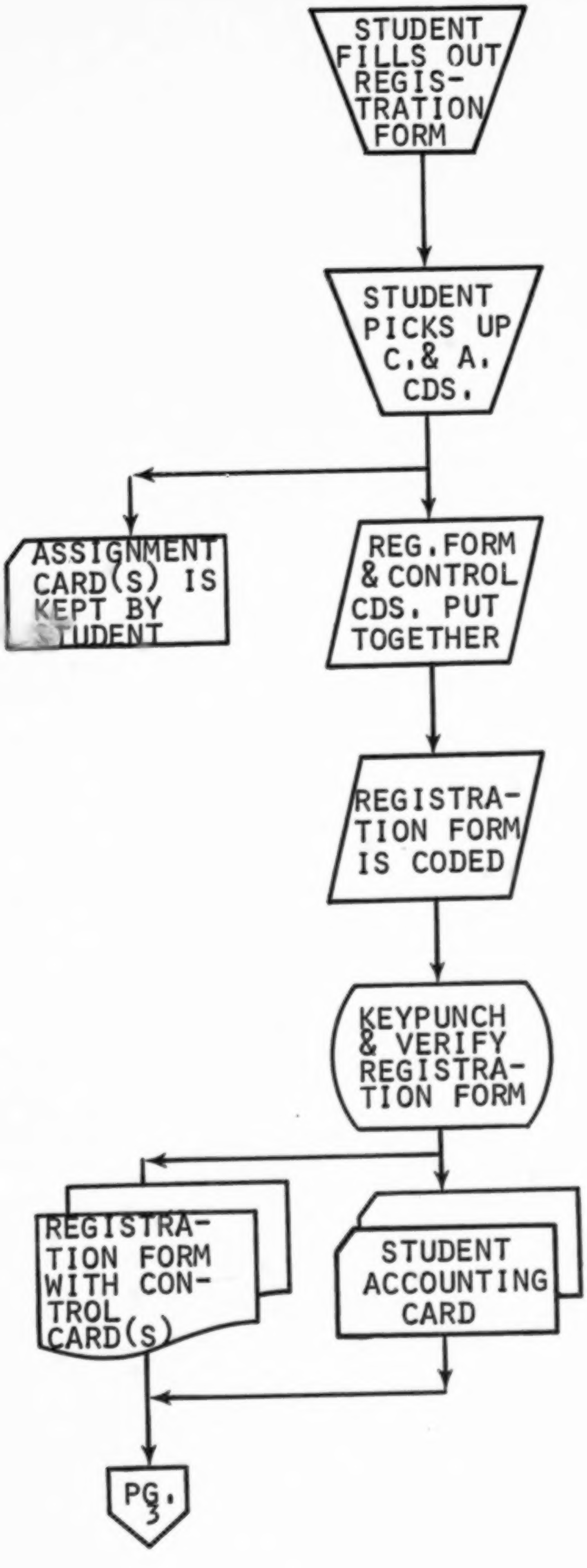
PERMIT TO REGISTER

☐DAY ☐EVE. ☐SEM.1 ☐SEM.2 ☐FULL-TIME ☐PART-TIME DATE_______196_ PRINT ALL INFORMATION

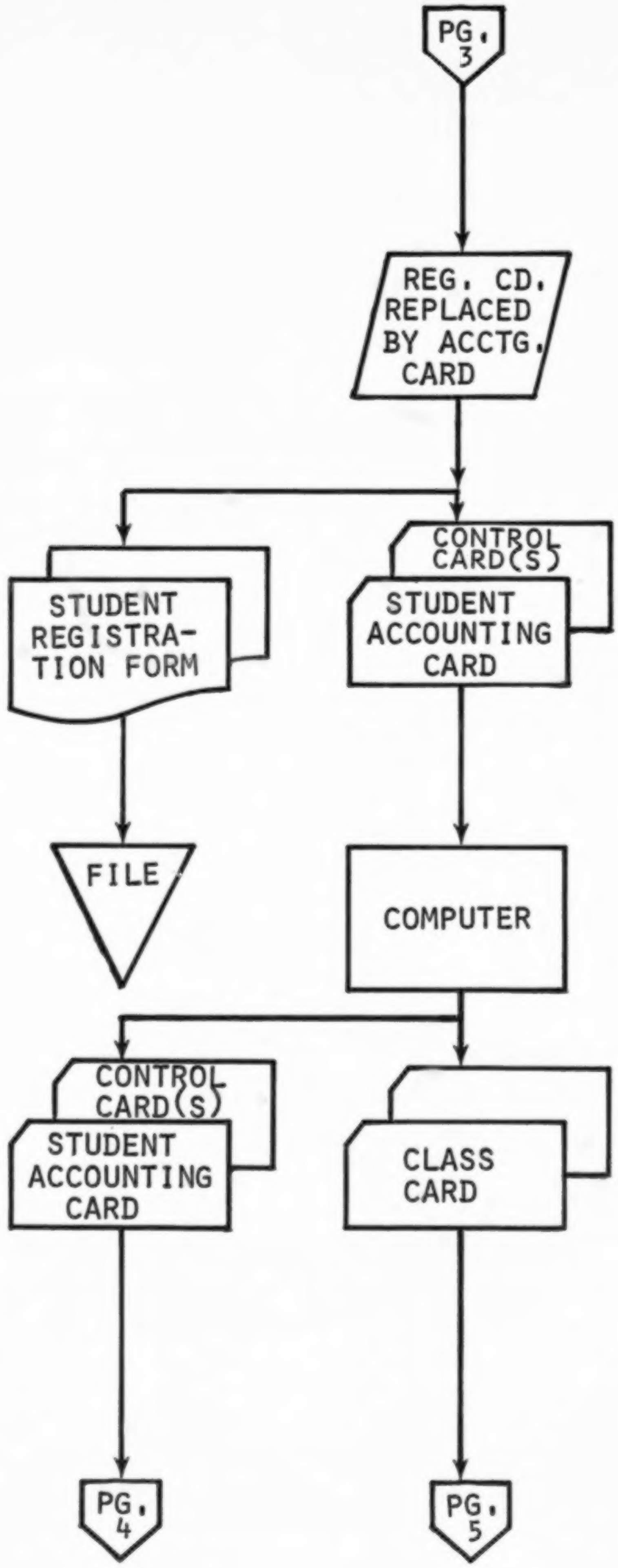
SOCIAL SECURITY NO.	NAME: LAST FIRST MIDDLE	PROGRAM CODE	PROGRAM TITLE

COURSE TITLE	COURSE (8 DIGITS)	FEE	COURSE TITLE	COURSE (8 DIGITS)	FEE

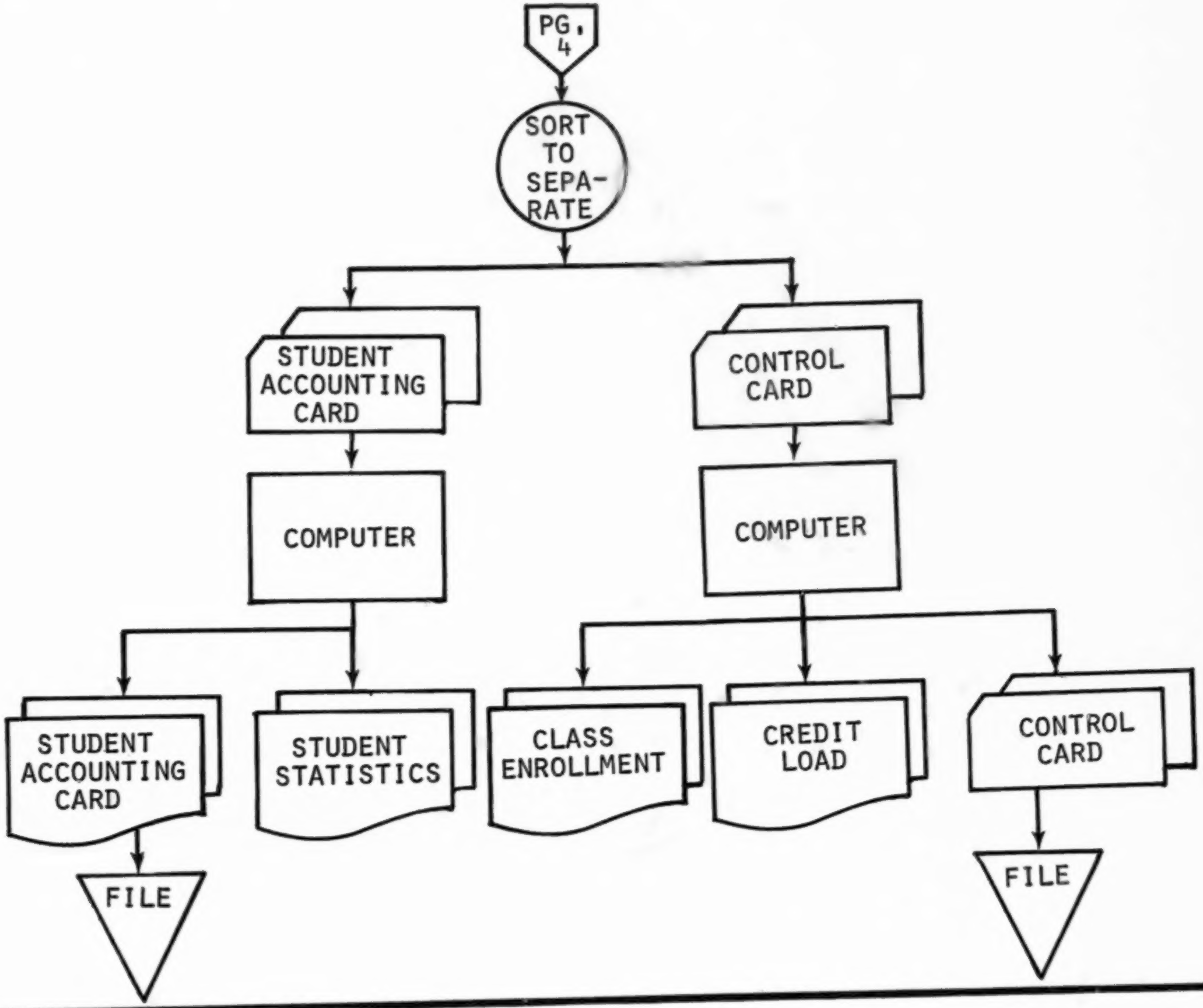
REGISTRATION PROCEDURE


STUDENT FILLS OUT REGISTRATION FORM
STUDENT PICKS UP C.& A. CDS.
ASSIGNMENT CARD(S) IS KEPT BY STUDENT
REG.FORM & CONTROL CDS. PUT TOGETHER
REGISTRATION FORM IS CODED
KEYPUNCH & VERIFY REGISTRATION FORM
REGISTRATION FORM WITH CONTROL CARD(S)
STUDENT ACCOUNTING CARD
PG. 3

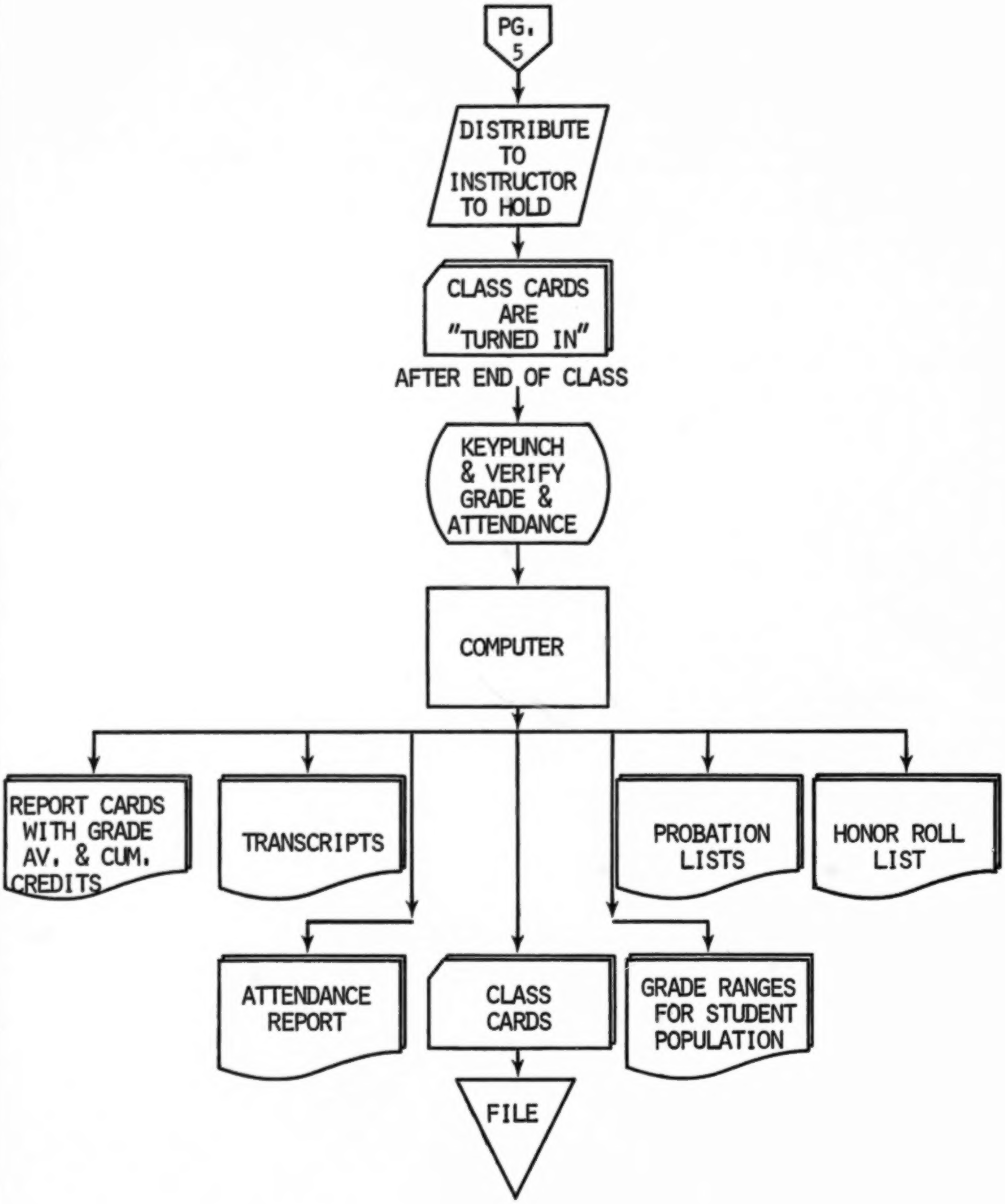
REGISTRATION PROCEDURE CONTINUED


PG. 3
REG. CD. REPLACED BY ACCTG. CARD
STUDENT REGISTRATION FORM
CONTROL CARD(S)
STUDENT ACCOUNTING CARD
FILE
COMPUTER
CONTROL CARD(S)
STUDENT ACCOUNTING CARD
CLASS CARD
PG. 4
PG. 5

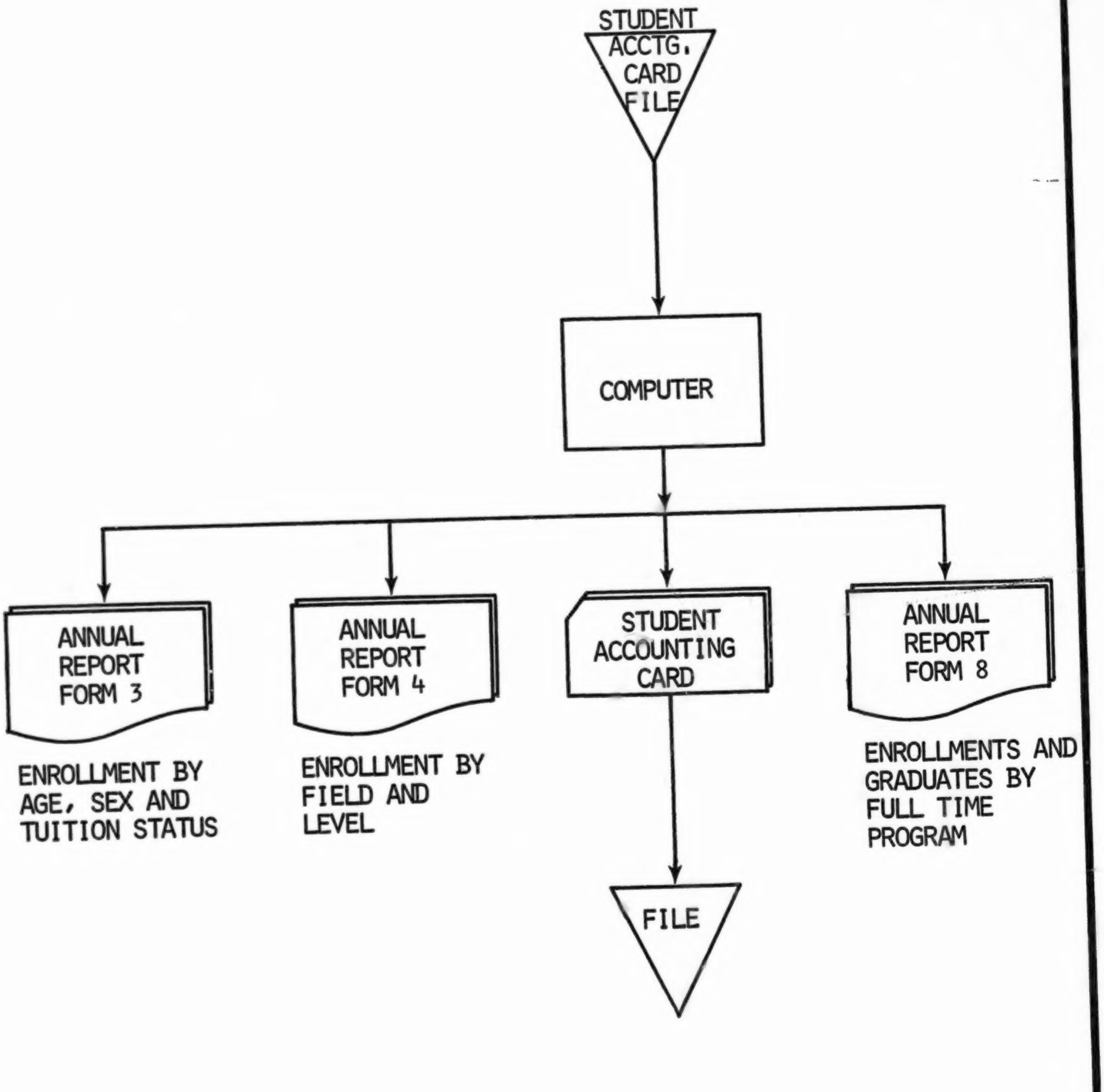
REGISTRATION PROCEDURE CONTINUED


PG. 4
SORT TO SEPARATE
STUDENT ACCOUNTING CARD
CONTROL CARD
COMPUTER
COMPUTER
STUDENT ACCOUNTING CARD
STUDENT STATISTICS
CLASS ENROLLMENT
CREDIT LOAD
CONTROL CARD
FILE
FILE

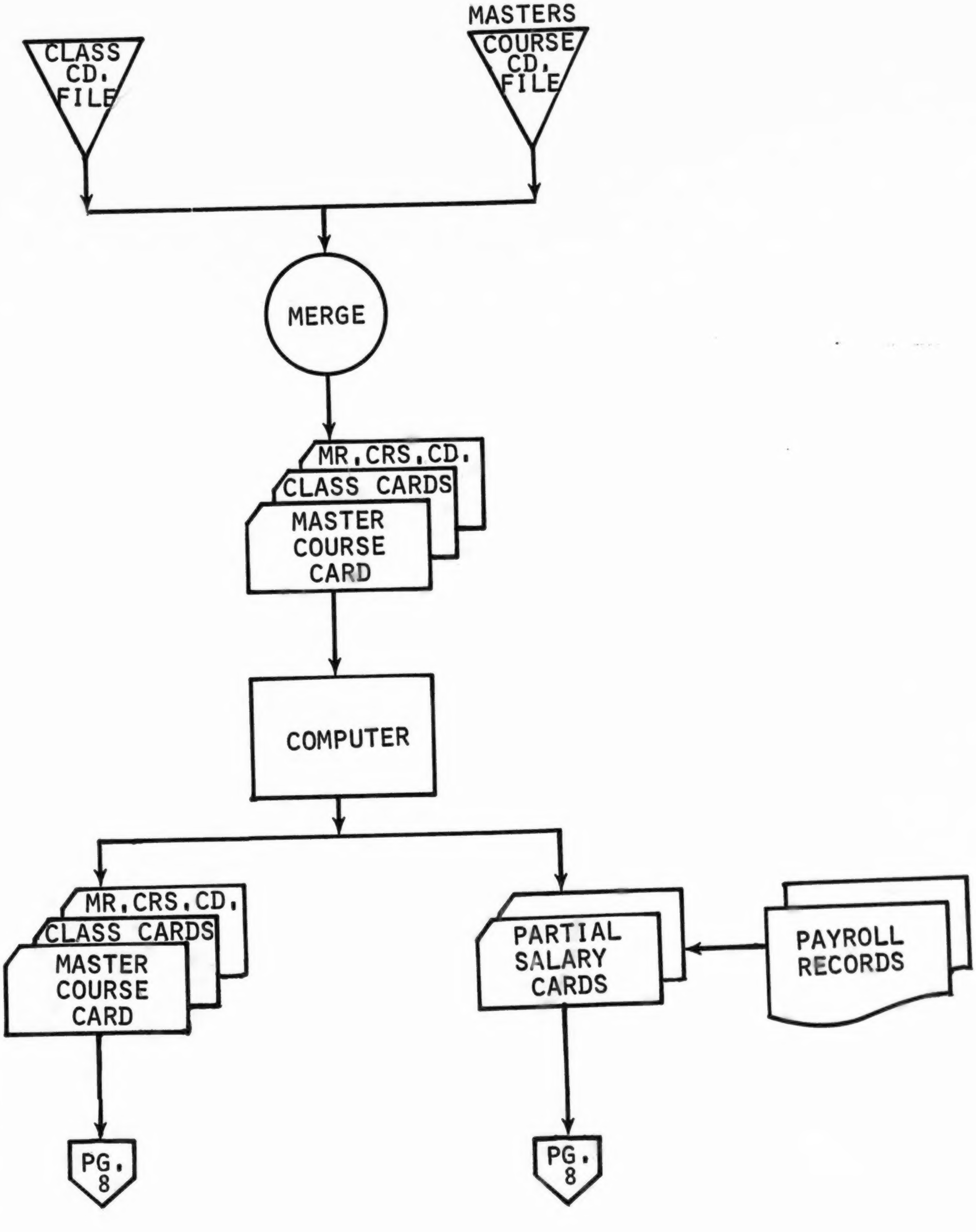
REGISTRATION PROCEDURE CONTINUED


PG. 5
DISTRIBUTE TO INSTRUCTOR TO HOLD
CLASS CARDS ARE "TURNED IN"
AFTER END OF CLASS
KEYPUNCH & VERIFY GRADE & ATTENDANCE
COMPUTER
REPORT CARDS WITH GRADE AV. & CUM. CREDITS
TRANSCRIPTS
PROBATION LISTS
HONOR ROLL LIST
ATTENDANCE REPORT
CLASS CARDS
GRADE RANGES FOR STUDENT POPULATION
FILE

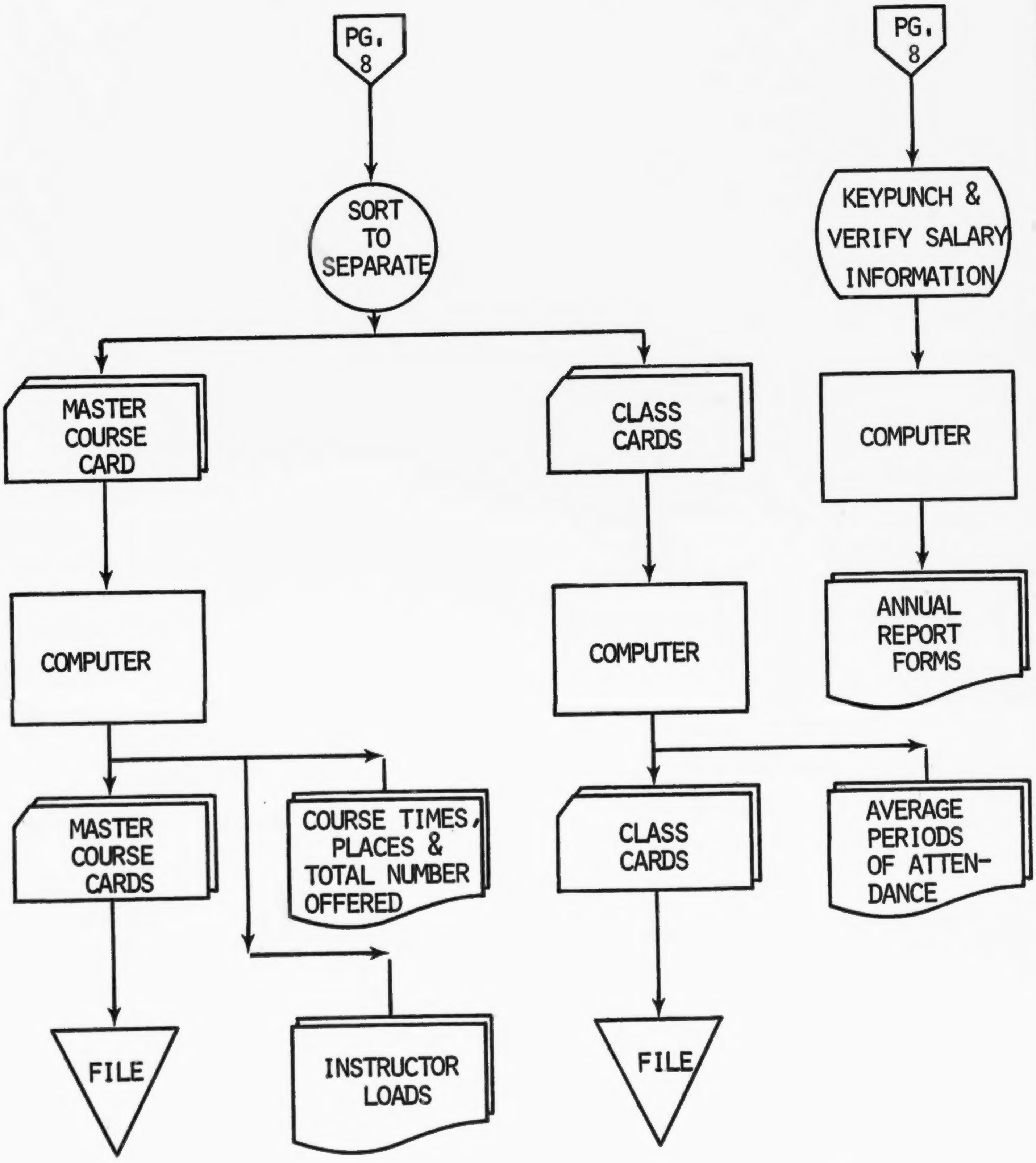
ANNUAL REPORTS PROCEDURE FOR ENROLLMENTS


STUDENT ACCTG. CARD FILE
COMPUTER
ANNUAL REPORT FORM 3
ANNUAL REPORT FORM 4
STUDENT ACCOUNTING CARD
ANNUAL REPORT FORM 8
ENROLLMENT BY AGE, SEX AND TUITION STATUS
ENROLLMENT BY FIELD AND LEVEL
ENROLLMENTS AND GRADUATES BY FULL TIME PROGRAM
FILE

ANNUAL REPORTS PROCEDURE FOR TEACHER LOAN AND COST BY COURSE


CLASS CD. FILE
MASTERS COURSE CD. FILE
MERGE
MR.CRS.CD.
CLASS CARDS
MASTER COURSE CARD
COMPUTER
MR.CRS.CD.
CLASS CARDS
MASTER COURSE CARD
PARTIAL SALARY CARDS
PAYROLL RECORDS
PG. 8
PG. 8

ANNUAL REPORTS PROCEDURE FOR TEACHER LOAD AND COST BY COURSE (CONTINUED)


PG. 8
SORT TO SEPARATE
MASTER COURSE CARD
CLASS CARDS
COMPUTER
COMPUTER
MASTER COURSE CARDS
COURSE TIMES, PLACES & TOTAL NUMBER OFFERED
INSTRUCTOR LOADS
FILE
CLASS CARDS
AVERAGE PERIODS OF ATTENDANCE
FILE
PG. 8
KEYPUNCH & VERIFY SALARY INFORMATION
COMPUTER
ANNUAL REPORT FORMS

SECTION 9

LIMITATIONS OF PPBS

A. *Objective.* The objective of this section is to provide the learner with knowledge and skills related to the limitations of PPBS.

B. *Desired Outcomes.* If the general objective of this section has been achieved, the learner should be able to:

1. Identify the effects that adoption of a new management system may produce in an organization.
2. Identify the implications for agency strategy when PPB analysis shows the agency program to be less efficient than other programs.
3. List the ways in which PPB can be made to produce positive results for the organization.
4. Identify the counter strategies for assuming which can be pursued by a superordinate's subsystem to insure a "good" analysis.
5. Identify the relationships that exist among the management system, the organizational objectives, and the political system.

C. *Prerequisites.* Satisfactory completion of the objectives presented in Sections 4 and 5 or their equivalent.

D. *Placement of Section in Sequence.* If this section is to be used independently, the learners should first be aware of the concepts and methodologies presented in Sections 1, 4, and 5.

E. *Pre-evaluation.* The learner may be asked to demonstrate proficiency in the specific objectives of Sections 1 through 6 before being introduced to this section. Learners with experience in the budgeting process and/or in cost-benefit analysis should be better prepared for this section although such experience is not required.

F. *Minimum Time Estimate.* Approximately two to four hours should be devoted to the lecture-presentation of the basic concepts presented in this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Responses to PPBS	175
a. Agency	176
b. Administrator	177, 178

2. Analysis Limitations
   a. Strategies 179
   b. Counter-Strategies 180
   c. Counter-Counter-Strategies 181
3. Conclusions 182

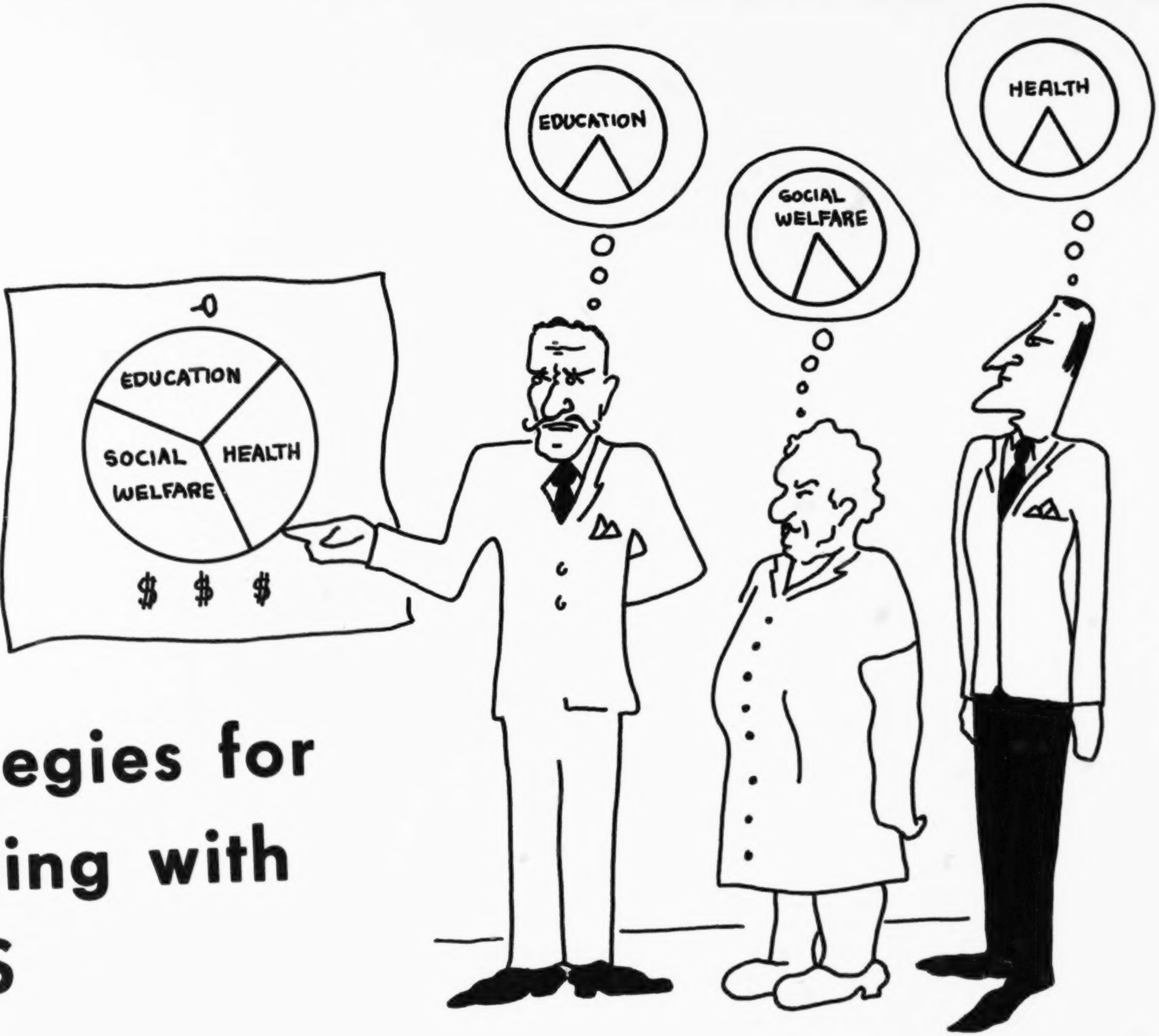
H. *Suggested Instructional Activities.*

1. Informal seminars may be held to clarify the concepts alluded to in the general objective.
2. Small groups may use the guidelines as a study guide and apportion the responsibility for securing information among themselves.
3. Small groups may analyze descriptions of their own or hypothetical organizations in relation to the specific objectives stated in this section.
4. Use benefit/cost problem in *A Case Problem* to demonstrate different outcomes using different assumptions regarding interest rates, benefits, and costs.
5. Critique a program memorandum based on a contemporary program analysis of an educational program; ask learners to show how legitimate differences in assumptions might effect the economic desirability of the program.
6. Complete Step VIII, Evaluation of Program Budget and PPBS, in *Volume II: A Case Problem.*

I. *Reference Materials.*

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. Harold Hovey, *Techniques for Evaluating Government Programs* (New York: Praeger, Inc., 1968).
4. Aaron Wildavsky, *The Politics of the Budgetary Process* (Boston: Little, Brown, 1964).
5. Charles E. Lindblom, *The Intelligence of Democracy* (Glencoe: Free Press, 1965).
6. R. M. Cyert and J. G. March, *A Behaviorial Theory of the Firm* (Prentice-Hall, Inc., 1963).

J. *Instructional Aids*--pages 175 through 182.


EDUCATION
SOCIAL WELFARE
HEALTH
$ $ $
EDUCATION
SOCIAL WELFARE
HEALTH

Strategies for Dealing with PPBS

LIMITATIONS OF PPBS

STRATEGIES FOR DEALING WITH PPB*

ASSUMPTION: AN AGENCY'S BUDGETARY ACTIVITIES ARE DIRECTED TOWARD ITS SURVIVAL AND TOWARD INCREASING ITS BUDGET. THIS IS SO BECAUSE:

A. IN OCCUPATIONAL CHOICES PEOPLE TEND TO FOLLOW THEIR OWN INTERESTS AND HENCE SUPPORT THE AGENCY POSITION.

B. THEIR PROGRAM AND OCCUPATIONAL ORIENTATION ARE REINFORCED BY ASSOCIATION WITH OTHERS OF COMPARABLE BELIEFS.

C. THEIR PERSONAL FUTURE WELFARE IS INTERTWINED WITH AGENCY SUCCESS.

WHEN A NEW MANAGEMENT SYSTEM (PPBS) IS ANNOUNCED, IT CAN HAVE FOUR EFFECTS ON AN AGENCY:

A. THE AGENCY WILL WANT TO LEARN MORE ABOUT THE SYSTEM TO MAXIMIZE ITS POSITION IN "USING" THE SYSTEM.

B. THE SYSTEM WILL HELP THE AGENCY.

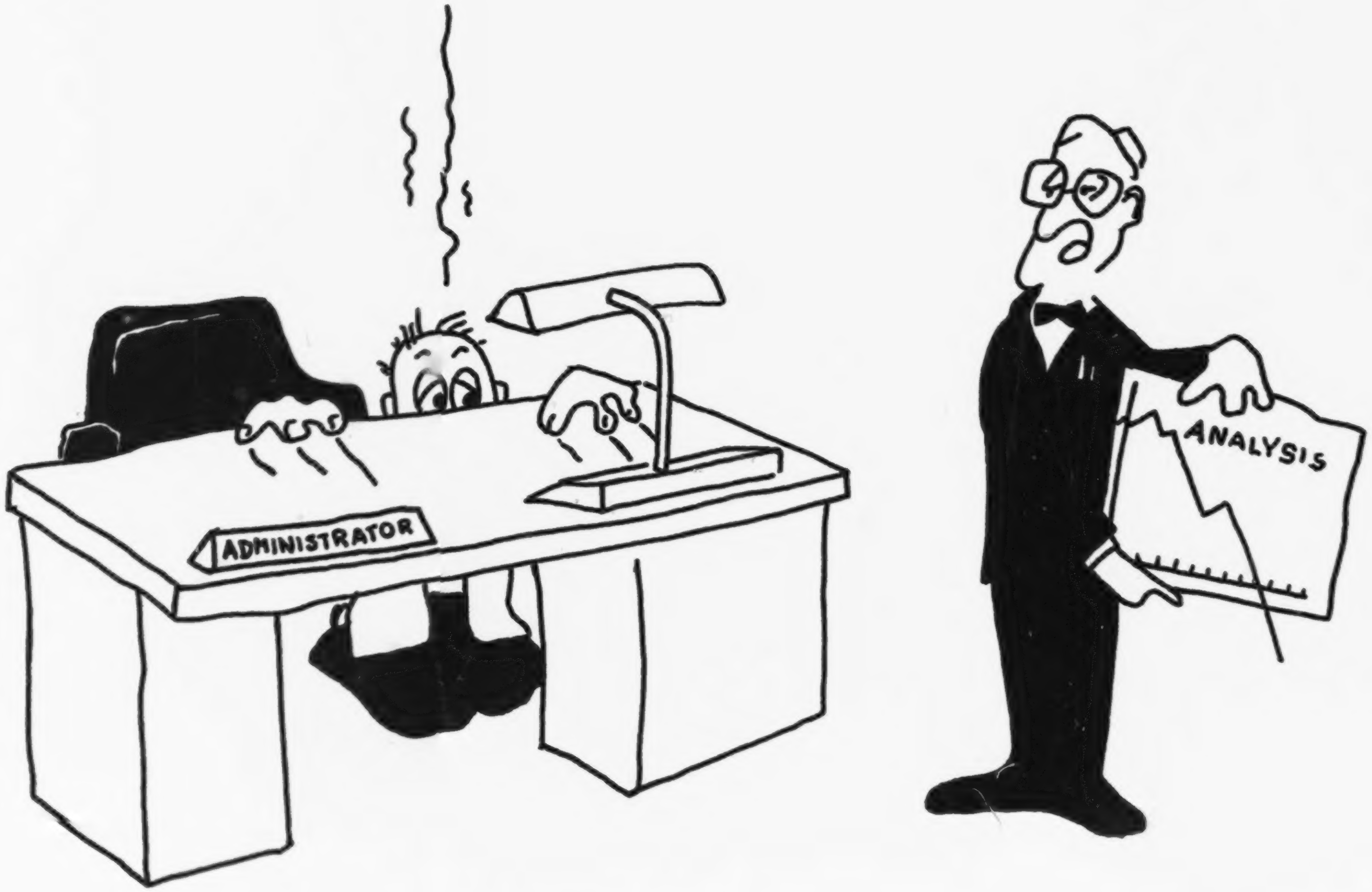
C. THE SYSTEM WILL NOT AFFECT THE AGENCY.

D. THE SYSTEM WILL RETARD THE AGENCY IN ACHIEVING ITS OBJECTIVES.

---

*HOVEY, HAROLD, A., *THE PLANNING-PROGRAMMING-BUDGETING APPROACH TO GOVERNMENT DECISION MAKING*, NEW YORK, NEW YORK.

A Program Administrator Is Confronted


ADMINISTRATOR
ANALYSIS

A SAMPLE STRATEGY

WHEN A PROGRAM ADMINISTRATOR IS CONFRONTED WITH A STUDY WHICH SHOWS HIS PROGRAM TO BE NOT AS GOOD AS ANOTHER FOR ACHIEVING AN OBJECTIVE HE MUST CONCLUDE:

A. SOMETHING IS WRONG WITH HIS PROGRAM.

B. THERE IS SOMETHING WRONG WITH THE ANALYSIS.

QUESTION: IN WHAT ORDER DO YOU THINK THE ADMINISTRATOR WILL STUDY THESE CONCLUSIONS?

SOME REASONS FOR SELECTING CONCLUSION B

"LEGITIMATE" REASONS FOR EQUALLY COMPETENT ANALYSTS TO DISAGREE

1 THE USES OF "SHADOW PRICES"

2 SOCIAL TIME PREFERENCE AS A MEASURE OF THE PRICE OF MONEY

3 DIFFERENTIATING UNCERTAINTY AND RISK

4 COUNTING EXTERNAL BENEFITS

5 INTEREST RATE(S)

6 THE USE OF COST-BENEFIT RATIOS AS A RANKING FUNCTION

OTHER REASONS FOR DISAGREEMENT WITH ANALYSIS

1 INHERENT VALUE OF PROGRAM

2 ECONOMIC EFFECTS NOT AS IMPORTANT AS SOCIAL, CULTURAL, MILITARY, ETC.

HOW TO MAKE PPB WORK IN YOUR FAVOR

1 SELECT THE MOST FAVORABLE INTEREST RATE.

2 COUNT YOUR "CONSUMERS'S SURPLUS" BUT NOT THE OTHER GUY'S.

3 COUNT BENEFITS REGARDLESS OF CAUSE.

4 ASSUME THE OPTIMAL DISTRIBUTION OF BENEFITS.

5 SEARCH FOR AND COUNT "UNEMPLOYED RESOURCES."

6 COUNT INCOME REDISTRIBUTION AS A BENEFIT.

7 OPTIMISTICALLY PROJECT USE OF YOUR "PRODUCT."

8 IGNORE COSTS.

9 SEEK TO DISCOVER "NEW" OBJECTIVES OR CATEGORIES OF BENEFITS.

10 OVERESTIMATE TOTAL BENEFITS AND UNDERESTIMATE TOTAL COSTS WHILE USING APPROPRIATE GROUND RULES.

. . . OR NOT AT ALL

1 CAN'T FIND OBJECTIVES.

2 CAN'T IDENTIFY CRITERIA FOR MEASURING ACCOMPLISHMENT.

3 FAIL TO FIND DATA WITH WHICH TO EVALUATE YOUR PROGRAMS.

4 OMIT ALTERNATIVES.

COUNTER-STRATEGIES FOR "GOOD" ANALYSIS

A. COMPETITION AMONG AGENCIES
   1. GOOD IN THEORY
   2. RESULTS DO NOT SUPPORT THE THEORY

B. INDEPENDENT REVIEW
   1. THEORY: THOSE WHO REVIEW SHOULD BE INDEPENDENT OF THOSE WHO PROPOSE
   2. PRACTICE:
      a. AT PRESENT NO CENTRAL GUIDELINES
      b. COULD NOT COPE WITH EVEN "HONEST" ANALYSIS
      c. IF REVIEW WERE MADE BY AN "INSIDE" AGENCY ONE COULD NOT EXPECT MUCH CHANGE; IF MADE BY AN "OUTSIDE" AGENCY, ACCESS TO INFORMATION, AND/OR COST OF FULL INDEPENDENT ANALYSIS WOULD MAKE IT DIFFICULT TO DO

C. CENTRAL GUIDELINES
   1. MOST OF THE PROBLEMS OF "FUDGING" COULD BE REDUCED
   2. SEEKING AND FINDING OF "OBJECTIVES" WOULD REMAIN
   3. DEPENDS UPON SUPPORT OF BOTH THE CHIEF EXECUTIVE AND LEGISLATURE

D. USER CHARGES
   1. CHARGE OVERHEAD (RETIREMENT) TO PROGRAMS
   2. BRING PUBLIC INTEREST RATES INTO LINE WITH PRIVATE SECTOR

COUNTER-COUNTER-STRATEGIES

IF AN AGENCY AND ITS CLIENTELE GROUPS ARE "LOSING" WITHIN STANDARDS OR GUIDELINES ESTABLISHED BY THE EXECUTIVE BRANCH, THEY MAY SEEK RELIEF THROUGH THE OTHER BRANCHES OF GOVERNMENT: THE LEGISLATURES OR THE COURTS.

A. A LEGISLATIVE BODY MAY LEGISLATE "STANDARDS" WHICH ARE FAVORABLE TO THE AGENCY.

B. A COURT MAY RULE THAT CERTAIN "OPTIONS OR LAWS ARE NOT "CONSTITUTIONAL."

C. THE EXECUTIVE CAN CHOOSE NOT TO SPEND APPROPRIATED MONIES.

MANY OTHER ACTIONS ARE POSSIBLE FOR ACHIEVING AN AGENCY'S OBJECTIVES EVEN THOUGH THEY MAY NOT MEET THE CRITERION OF ECONOMIC EFFICIENCY. THESE ACTIONS ARE POLITICAL (EVEN PPBS TAKES PLACE THROUGH A POLITICAL PROCESS) AND HENCE TOOLING UP FOR PARTICIPATION IN THE POLITICAL PROCESS IS PERHAPS MORE IMPORTANT THAN TOOLING UP FOR PPBS; BUT ONLY A NAIVE POLICY MAKER WOULD IGNORE PPBS AND ITS IMPLICATIONS FOR HIS PROGRAM.

CONCLUSIONS

IN THE SHORT RUN, A VOCATIONAL AGENCY MAKING AN ATTEMPT TO PRESENT ITS PROGRAM IN TERMS OF COST AND BENEFITS WILL HAVE A "LEG UP" ON OTHER AGENCIES; THE NUMBERS OF PERSONS PLACED IN JOBS AND THEIR INCREASED EARNINGS HELP GOVERNORS GET RE-ELECTED.

IN THE LONG RUN, PPBS MAY INDEED BECOME THE MEANS TO MORE EFFICIENT APPROACHES TO MEETING LOCAL AND NATIONAL MANPOWER NEEDS; AN AGENCY WITH EXPERIENCE IN PPBS SHOULD BE IN A BETTER POSITION TO LEAD IN THE QUEST FOR "MORE BANG FOR THE BUCK."

SUPPLEMENTS TO THE BASIC EDUCATIONAL PROGRAM

PART III

SECTION 10

CONCEPTUAL FRAMEWORK FOR PLANNING AND CONTROL SYSTEMS

A. *Objective.* The objective of this section is to provide the learner with knowledge and skills related to a conceptual framework for planning and control systems.

B. *Desired Outcomes.* If the general objective of this section has been achieved the learner should be able to:

1. Identify the reasons why a framework is needed for planning and control systems.
2. Differentiate among strategic planning, management control, and operational control.
3. Describe the relationships which exist among the elements of the conceptual framework.
4. Describe areas of conflict between strategic planning and management control.
5. Describe the relationships of this section to PPBS and its elements.

C. *Prerequisite.* Satisfactory achievement of the objectives outlined in Sections 1 and 3 or equivalent knowledge and skills.

D. *Placement of Section in Sequence.* This section may be used independently. If learning activities are directed toward attainment of knowledge and skills in the general concept of PPBS it is recommended that Sections 1 and 3 of this component precede this section. This section may also be used as an introduction to Section 6.

E. *Pre-evaluation.* The learner may be asked to demonstrate achievement of the specific objectives in Sections 1, 2, and 5.

F. *Minimum Time Estimate.* Approximately two to four hours should be utilized in the lecture-presentation of the basic concepts of this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Need for a Framework	187, 188
2. The Framework	189-192

    a. Limitations 193, 194
    b. Information 194, 195
3. Detailed Consideration of Framework 196
    a. Distinctions 197-201
    b. Educational Example 202-204
4. Summary
    a. Conflicts 205
    b. Misconceptions 206, 207
    c. Relationship to PPBS 209

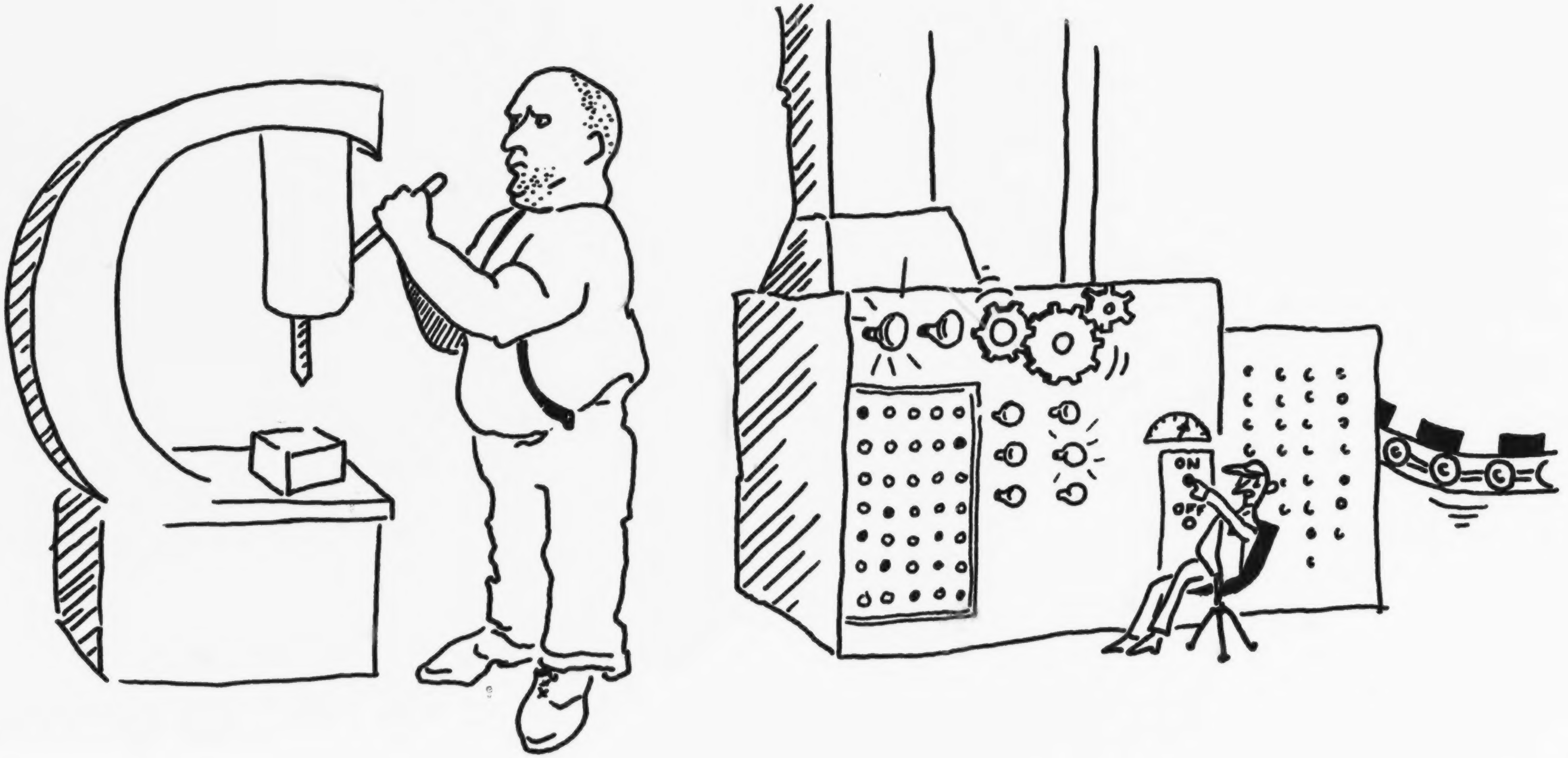
H. *Suggested Instructional Activities.*

1. The learners may discuss the major concepts, referred to in the general objective of this section, in a seminar.
2. Individual learners may use portions of this section as a research outline for the development of a term paper.
3. Case studies or similar problem-solving material may be introduced in small seminars as the major concepts of this section are discussed.
4. Individuals or groups may engage in a comparative study of the planning and control techniques in use by their organization and the techniques suggested by the framework presented in this section.

I. *Reference Material.*

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. R. N. Anthony, *Planning and Control Systems* (Cambridge: Harvard Graduate School of Business Administration, 1965).
3. H. L. Timms, *Introduction to Operations Management* (Homewood, Illinois: Irwin, Inc., 1967).
4. J. H. Greene, *Operations Planning and Control* (Homewood, Illinois: Irwin, Inc., 1967).

J. *Instructional Aids*--pages 187 through 209.



Planning and Control Systems

PLANNING AND CONTROL SYSTEMS*

THE NEED FOR A FRAMEWORK

- TO DIRECT EFFORTS OF AN ANALYST
- TO MAKE CONCLUSIONS MORE VALID
- TO MAKE GENERALIZATIONS MORE SPECIFIC
- TO GIVE PERSPECTIVE TO THE VARIOUS DUTIES OF MANAGEMENT

POTENTIAL USERS OF FRAMEWORK

- OPERATING PRACTITIONERS
- RESEARCHERS
- TEACHERS
- STUDENTS

---

*BASED ON ROBERT M. ANTHONY, *PLANNING AND CONTROL SYSTEMS*, HARVARD UNIVERSITY, 1965

CONCEPTUAL FRAMEWORK

STRATEGIC PLANNING: THE PROCESS OF DECIDING

ON OBJECTIVES OF THE ORGANIZATION

ON CHANGES IN THESE OBJECTIVES

ON THE RESOURCES USED TO ATTAIN THESE OBJECTIVES

ON THE POLICIES THAT ARE USED TO GOVERN THE ACQUISITION, USE, AND DISPOSITION OF THESE RESOURCES

MANAGEMENT CONTROL: THE PROCESS BY WHICH MANAGERS ASSURE THAT RESOURCES ARE OBTAINED AND USED EFFECTIVELY AND EFFICIENTLY IN THE ACCOMPLISHMENT OF THE ORGANIZATION'S OBJECTIVES

OPERATIONAL CONTROL: THE PROCESS OF ASSURING THAT SPECIFIC TASKS ARE CARRIED OUT EFFECTIVELY AND EFFICIENTLY

ACTIVITIES OF A GOVERNMENTAL ORGANIZATION

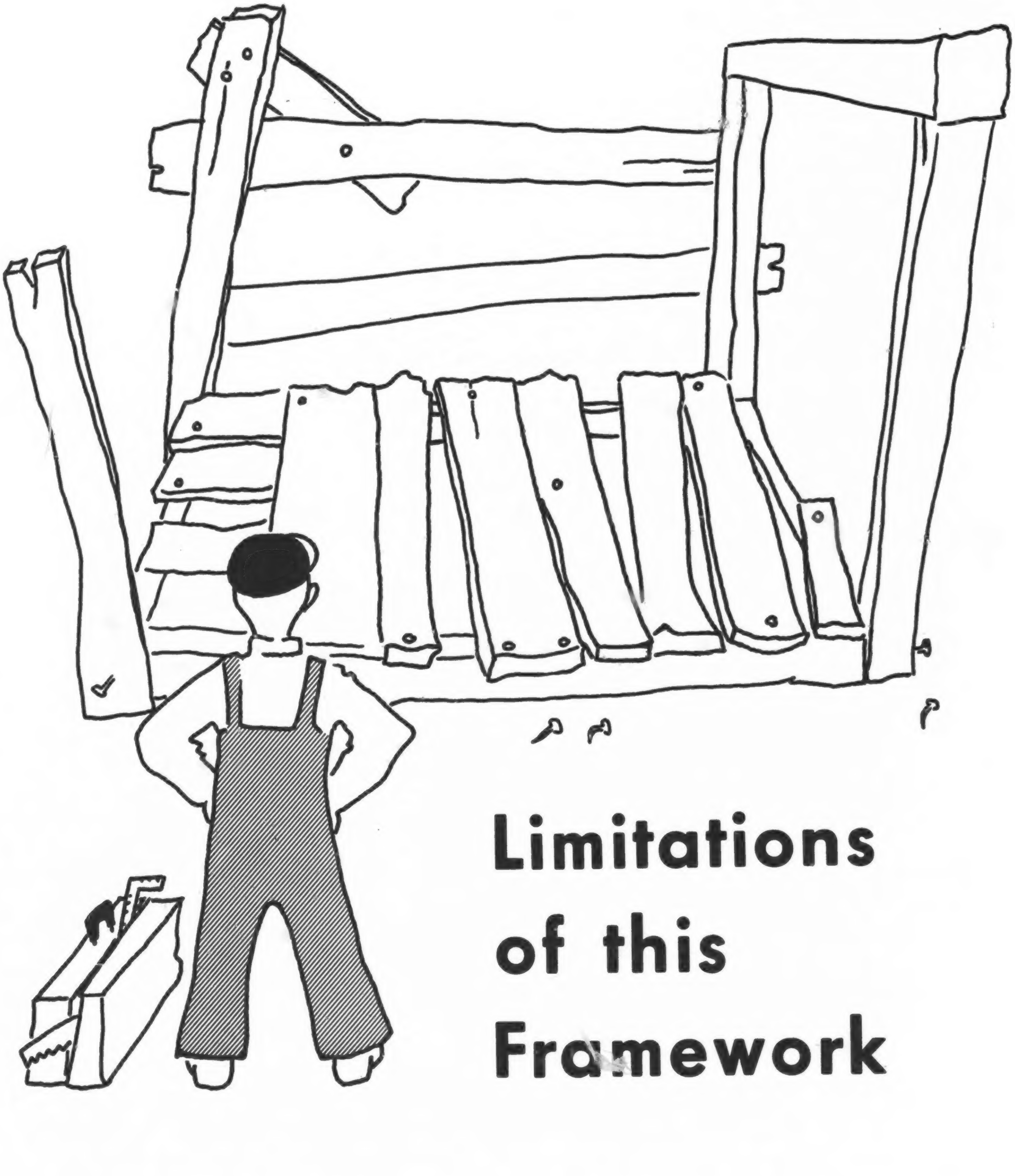
STRATEGIC PLANNING	MANAGEMENT CONTROL	OPERATIONAL CONTROL
CHOOSING AGENCY OBJECTIVES	FORMULATING BUDGETS	
PLANNING THE ORGANIZATION	PLANNING STAFF LEVELS	CONTROLLING HIRING
SETTING PERSONNEL POLICIES	FORMULATING PERSONNEL PRACTICES	IMPLEMENTING POLICIES
SETTING FINANCIAL POLICIES	WORKING CAPITAL PLANNING	CONTROLLING PRIORITY ORDER FOR BILL PAYMENT
SETTING PLACEMENT POLICIES	FORMULATING INFORMATIONAL PROGRAMS	CONTROLLING PLACEMENT OF ADVERTISEMENTS
SETTING RESEARCH POLICIES	DECIDING ON RESEARCH PROJECTS	
CHOOSING NEW ENDEAVORS	CHOOSING THE INPUT MIX OF RESOURCES	
ACQUIRING ADDITIONAL PROGRAMS	DECIDING ON FACILITY ORGANIZATION	SCHEDULING CLASSES VIA COMPUTER
DECIDING ON NONROUTINE CAPITAL EXPENDITURES	DECIDING ON ROUTINE CAPITAL EXPENDITURES	
	FORMULATING DECISION RULES FOR OPERATIONAL CONTROL	CONTROLLING INVENTORY
	MEASURING, APPRAISING, AND IMPROVING MANAGEMENT AND SUPERVISION	MEASURING, APPRAISING, AND IMPROVING EMPLOYEES' EFFICIENCY

DISTINCTIONS BETWEEN STRATEGIC PLANNING AND MANAGEMENT CONTROL

PLANNING	*CHARACTERISTIC*	CONTROL
ON ONE ASPECT AT A TIME	*FOCUS OF PLANS*	ON WHOLE ORGANIZATION
MANY VARIABLES	*COMPLEXITIES*	LESS COMPLEX
UNSTRUCTURED AND IRREGULAR; EACH PROBLEM DIFFERENT	*DEGREE OF STRUCTURE*	RHYTHMIC; PRESCRIBED PROCEDURES
SPECIFIC FOR PROBLEM; MORE EXTERNAL AND PREDICTIVE; LESS ACCURATE	*NATURE OF INFORMATION*	INTEGRATED; INTERNAL AND HISTORICAL; MORE ACCURATE
RELATIVELY SIMPLE	*COMMUNICATION OF INFORMATION*	RELATIVELY DIFFICULT
SHOW EXPECTED RESULTS	*PURPOSE OF ESTIMATES*	LEAD TO DESIRED RESULTS
STAFF AND TOP MANAGEMENT	*PERSONNEL INVOLVED*	LINE AND TOP MANAGEMENT
SMALL	*NUMBER OF PERSONNEL INVOLVED*	LARGE
CREATIVE; ANALYTICAL	*MENTAL ACTIVITY*	ADMINISTRATIVE; PERSUASIVE
ECONOMICS-PLANNING	*SOURCE DISCIPLINE*	SOCIAL PSYCHOLOGY-ADMINISTRATION
EMPHASIS ON PLANNING	*DEGREE OF PLANNING AND CONTROL*	EMPHASIS ON BOTH
LONG	*TIME HORIZON*	SHORT
POLICIES AND PRECEDENTS	*END RESULT*	ACTION WITHIN POLICIES AND PRECEDENTS
EXTREMELY DIFFICULT	*APPRAISAL OF THE JOB DONE*	LESS DIFFICULT

DISTINCTIONS BETWEEN MANAGEMENT CONTROL AND OPERATIONAL CONTROL

MANAGEMENT CONTROL	*CHARACTERISTIC*	OPERATIONAL CONTROL
WHOLE OPERATION	*FOCUS OF ACTIVITY*	SINGLE TASK OR TRANSACTION
RELATIVELY MUCH; SUBJECTIVE DECISIONS	*JUDGEMENT*	RELATIVELY LITTLE; RELIANCE ON RULES
PSYCHOLOGICAL	*NATURE OF STRUCTURE*	RATIONAL
INTEGRATED; FINANCIAL DATA THROUGHOUT; APPROXIMATIONS ACCEPTABLE; FUTURE AND HISTORICAL	*NATURE OF INFORMATION*	SPECIFIC FOR OPERATION; OFTEN NONFINANCIAL; PRECISE; PRESENT TIME
MANAGEMENT	*INVOLVED PERSONNEL*	SUPERVISORS
ADMINISTRATIVE; PERSUASIVE	*MENTAL ACTIVITY*	SMALL; FOLLOW GUIDELINES
SOCIAL PHYSCHOLOGY	*SOURCE DISCIPLINE*	ECONOMICS, PHYSICAL SCIENCES
WEEKS TO YEARS	*TIME HORIZON*	DAY TO DAY
MANAGED	*TYPE OF COSTS*	ENGINEERED



Limitations of this Framework

LIMITATIONS OF THIS FRAMEWORK

TO LARGE, COMPLEX ORGANIZATIONS WHICH:

- EXHIBIT SUSTAINED COLLECTIVE ACTION
- ARE INTEGRAL PARTS OF A LARGER SYSTEM
- HAVE SPECIALIZED GOALS
- ARE DEPENDENT UPON INTERCHANGE WITH A LARGER SYSTEM

EXCLUDES SMALL, "ONE-MAN" ADMINISTRATIVE ORGANIZATIONS

PRIMARILY APPLICABLE TO "WESTERN WORLD" CULTURAL ENVIRONMENT

INFORMATION GENERATION

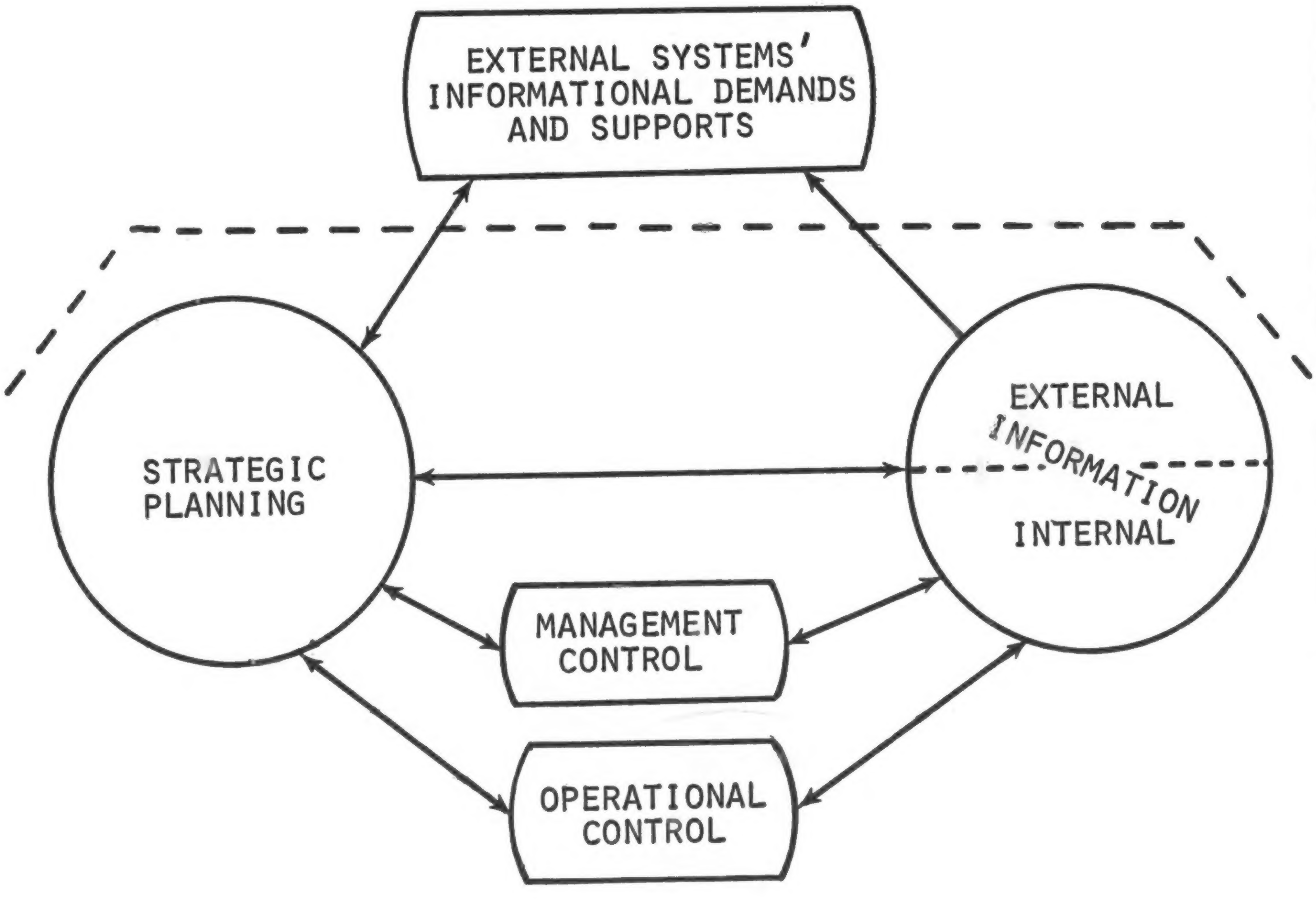
DEFINITION: THE PROCESS OF COLLECTING, MANIPULATING, AND TRANSMITTING INFORMATION, WHATEVER ITS USE IS TO BE

INFORMATION GENERATION AND USE IS RELATED TO THE THREE BASIC CONCEPTS, BUT ALSO HAS IMPLICATIONS INDEPENDENT OF THE INTENDED USE OF THE DATA

INFORMATION HAS VALUE FOR INTERNAL ORGANIZATION USE--(PLANNING AND CONTROL)

INFORMATION HAS VALUE FOR EXTERNAL OR LARGER ENVIRONMENTAL USE

CONCEPTUALIZATION OF PLANNING AND CONTROL PROCESSES AND INFORMATIONAL FLOWS IN ORGANIZATIONS


EXTERNAL SYSTEMS' INFORMATIONAL DEMANDS AND SUPPORTS
STRATEGIC PLANNING
EXTERNAL
INFORMATION
INTERNAL
MANAGEMENT CONTROL
OPERATIONAL CONTROL

DETAILED CONSIDERATION OF CONCEPTUAL FRAMEWORK

STRATEGIC PLANNING: THE PROCESS OF DECIDING ON OBJECTIVES OF THE ORGANIZATION, ON CHANGES IN THESE OBJECTIVES, ON THE LEVEL OF RESOURCES USED TO ATTAIN THESE OBJECTIVES, AND ON THE POLICIES THAT ARE USED TO GOVERN THE ACQUISITION, USE, AND DISPOSITION OF THESE RESOURCES.

MANAGEMENT CONTROL: THE PROCESS BY WHICH MANAGERS ASSURE THAT RESOURCES ARE OBTAINED AND USED EFFECTIVELY AND EFFICIENTLY IN THE ACCOMPLISHMENT OF THE ORGANIZATION'S OBJECTIVES.

OPERATIONAL CONTROL: THE PROCESS OF ASSURING THAT SPECIFIC TASKS ARE CARRIED OUT EFFECTIVELY AND EFFICIENTLY.

DISTINCTIONS BETWEEN STRATEGIC PLANNING AND MANAGEMENT CONTROL

SCOPE OF PROCESS

STRATEGIC PLANNING FOCUSES ON ONE MAJOR ASPECT OR ACTIVITY AT A TIME, BUT MUST CONSIDER THE EFFECT OF THAT ASPECT ON THE TOTAL ORGANIZATION.

MANAGEMENT CONTROL REQUIRES A MORE "TOTAL" SYSTEM BECAUSE OF THE NEED TO KEEP THE TOTAL SYSTEM IN "BALANCE."

COMPLEXITY OF PROCESS

STRATEGIC PLANNING IS COMPLEX WITH MANY VARIABLES BOTH WITHIN AND OUTSIDE OF THE SYSTEM.

MANAGEMENT CONTROL IS LESS COMPLEX; IT TAKES PLACE WITHIN A FRAMEWORK OF POLICIES AND PLANS ALREADY DECIDED UPON.

DEGREE OF STRUCTURE

STRATEGIC PLANNING IS DIFFICULT TO STRUCTURE TO ANY SET PATTERN.

MANAGEMENT CONTROL FOLLOWS A DEFINITE PATTERN AND TIMETABLE WHICH ARE REPEATED.

NATURE OF INFORMATION

STRATEGIC PLANNING RELIES ON MORE EXTERNAL AND PREDICTIVE DATA WHICH IS SPECIFIC FOR A PROBLEM.

MANAGEMENT CONTROL REQUIRES A MONEY OR QUANTITATIVELY BASED DATA WHICH PERMITS COORDINATION, RECONCILABILITY, AND INTEGRATION WITHIN AND BETWEEN SUBSYSTEMS; DATA MUST BE VIRTUALLY EXACT AND CURRENT.

COMMUNICATION OF INFORMATION

STRATEGIC PLANNING DOES NOT REQUIRE COMPLEX SYSTEMS FOR FACILITATING FLOWS OF INFORMATION BETWEEN PERSONNEL.

MANAGEMENT CONTROL DOES REQUIRE A SYSTEM TO FACILITATE INFORMATION FLOW BETWEEN PERSONNEL.

PURPOSE OF ESTIMATES

STRATEGIC PLANNING ESTIMATES ARE DESIGNED TO SHOW EXPECTED RESULTS OF ACTIONS; THEY ARE NEUTRAL AND IMPERSONAL.

MANAGEMENT CONTROL ESTIMATES ARE INTENDED TO INFLUENCE MANAGERS TO TAKE ACTION THAT WILL LEAD TO DESIRED RESULTS; OBJECTIVE OF MANAGEMENT IS ORGANIZATIONAL--INDIVIDUAL GOAL CONGRUENCE.

NUMBER AND TYPE OF PERSONNEL

STRATEGIC PLANNING INVOLVES RELATIVELY FEW PERSONNEL, PRIMARILY TOP MANAGEMENT AND THEIR STAFF.

MANAGEMENT CONTROL INVOLVES LARGE NUMBERS OF PERSONNEL, MANAGEMENT AT ALL LEVELS OF HIERARCHY.

MENTAL ACTIVITY

STRATEGIC PLANNING REQUIRES CREATIVE, AND ANALYTICAL ACTIVITY.

MANAGEMENT CONTROL RELIES PRIMARILY ON ADMINISTRATIVE AND PERSUASIVE ABILITY.

SOURCE DISCIPLINE

STRATEGIC PLANNING HAS ROOTS IN ECONOMICS, PHILOSOPHY, AND HUMANITIES AND FOCUSES ON THE ALLOCATION OF RESOURCES.

MANAGEMENT CONTROL DRAWS FROM THE BEHAVIORIAL SCIENCES--POLITICAL SCIENCE--SOCIOLOGY--PSYCHOLOGY--ANTHROPOLOGY.

PLANNING AND CONTROL

STRATEGIC PLANNING PRIMARILY INVOLVES PLANNING, BUT ALSO MUST CONSIDER CURRENT MANAGEMENT CONTROL PRACTICES.

MANAGEMENT CONTROL MUST CONSIDER BOTH PLANNING AND CONTROL WITH EMPHASIS ON CONTROL.

TIME HORIZON

STRATEGIC PLANNING IS COMPLETELY FUTURE ORIENTED WITH A LONG TIME PERSPECTIVE.

MANAGEMENT CONTROL IS CONCERNED WITH CURRENT OPERATIONS AND AND PRACTICES.

END RESULT

STRATEGIC PLANNING SETS POLICIES AND PRECEDENTS CONCERNING INVESTMENTS, PLACEMENT PRACTICES, ORGANIZATIONAL STRUCTURE, RESOURCE ALLOCATION, ETC.

MANAGEMENT CONTROL IMPLEMENTS POLICIES.

EVALUATION OF RESULTS

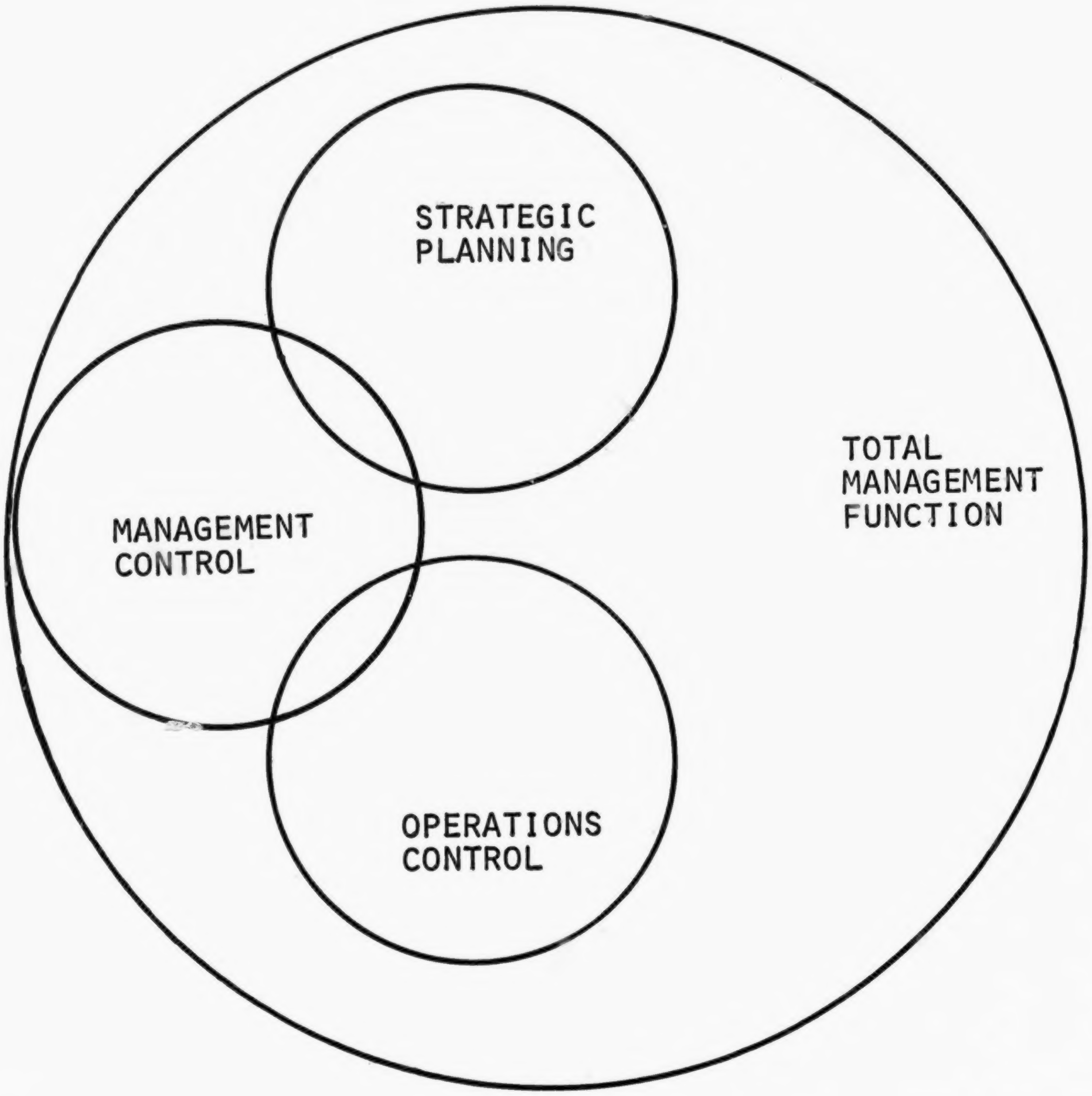
STRATEGIC PLANNING IS VERY DIFFICULT TO APPRAISE DUE TO THE LONG TIME HORIZON AND THE UNCERTAINITY OF ESTIMATING RESULTS OF ACTIONS NOT TAKEN.

MANAGEMENT CONTROL IS LESS DIFFICULT TO APPRAISE BECAUSE OBJECTIVES ARE MORE SPECIFIC AND TIME HORIZON IS SHORTER.

DISTINCTIONS BETWEEN STRATEGIC PLANNING AND MANAGEMENT CONTROL

PLANNING	*CHARACTERISTIC*	CONTROL
ON ONE ASPECT AT A TIME	*FOCUS OF PLANS*	ON WHOLE ORGANIZATION
MANY VARIABLES	*COMPLEXITIES*	LESS COMPLEX
UNSTRUCTURED AND IRREGULAR; EACH PROBLEM DIFFERENT	*DEGREE OF STRUCTURE*	RHYTHMIC; PRESCRIBED PROCEDURES
SPECIFIC FOR PROBLEM; MORE EXTERNAL AND PREDICTIVE; LESS ACCURATE	*NATURE OF INFORMATION*	INTEGRATED; INTERNAL AND HISTORICAL; MORE ACCURATE
RELATIVELY SIMPLE	*COMMUNICATION OF INFORMATION*	RELATIVELY DIFFICULT
SHOW EXPECTED RESULTS	*PURPOSE OF ESTIMATES*	LEAD TO DESIRED RESULTS
STAFF AND TOP MANAGEMENT	*PERSONNEL INVOLVED*	LINE AND TOP MANAGEMENT
SMALL	*NUMBER OF PERSONNEL INVOLVED*	LARGE
CREATIVE; ANALYTICAL	*MENTAL ACTIVITY*	ADMINISTRATIVE; PERSUASIVE
ECONOMICS-PLANNING	*SOURCE DISCIPLINE*	SOCIAL PSYCHOLOGY-ADMINISTRATION
EMPHASIS ON PLANNING	*DEGREE OF PLANNING AND CONTROL*	EMPHASIS ON BOTH
LONG	*TIME HORIZON*	SHORT
POLICIES AND PRECEDENTS	*END RESULT*	ACTION WITHIN POLICIES AND PRECEDENTS
EXTREMELY DIFFICULT	*APPRAISAL OF THE JOB DONE*	LESS DIFFICULT

CONCEPTUALIZATION OF THE THREE CONCEPTS AND THEIR OVERLAP


STRATEGIC PLANNING
TOTAL MANAGEMENT FUNCTION
MANAGEMENT CONTROL
OPERATIONS CONTROL

MANAGEMENT FUNCTIONS

EXAMPLES IN EDUCATION	STRATEGIC PLANNING	MANAGEMENT CONTROL	OPERATIONS CONTROL
1. DECISION TO UNDERTAKE VOCATIONAL EDUCATION IN COMPREHENSIVE HIGH SCHOOLS	X		
2. SCHEDULING CLASSES			X
3. DECIDING THE MIX BETWEEN TEACHERS, TEACHER AIDS, AUDIOVISUALS, ETC.	X	XX	X
4. CONSIDERATION OF CONSTRUCTING NEW BUILDING FACILITIES	X		
5. MAINTENANCE OF FACILITIES		X	X
6. PUBLIC RELATIONS		X	
7. PREPARATION OF ANNUAL BUDGETS		X	
8. HIRING TEACHERS, STAFF, ETC.		X	
9. SUPERVISING STAFF AND TEACHERS		X	
10. SCHEDULING BUSES			X
11. DECISIONS ON NUMBER OF BUSES		X	
12. DECISION OF TYPE OF TRANSPORTATION FACILITIES	X		
13. DECISION TO INCLUDE OR EXCLUDE TYPES OF VOCATIONAL PROGRAMS	X		
14. EVALUATION OF PROGRAMS	X	XX	
15. PREPARATION OF REQUIRED STATE AND FEDERAL FORMS			X
16. DAILY ATTENDANCE REPORTS			X
17. DECISION TO REORGANIZE ADMINISTRATIVE STRUCTURE	X		
18. ADMINISTRATION-TEACHER-PUPIL RELATIONSHIPS	X	X	

CONFLICT BETWEEN MANAGEMENT CONTROL AND STRATEGIC PLANNING ACTIVITIES

RESOURCES SPENT ON PLANNING ARE NOT AVAILABLE TO CURRENT PRODUCTION (RESEARCH VERSUS PRODUCTION)

ACTIONS WITH LONG TERM PAYOFFS MAKE CURRENT RETURNS SMALLER

PROBLEM IS WORSENED BY CONVENTIONAL ACCOUNTING SYSTEMS WHICH FAIL TO PROVIDE A CLEAR DISTINCTION BETWEEN THE TWO ACTIVITIES; HENCE AN ACCOUNTING SYSTEM SHOULD SEPARATE MONIES INTO TWO CATEGORIES

*OPERATING FUNDS
*INVESTMENTS

*SEE SECTION 6 FOR A MORE COMPLETE TREATMENT.

ANALOGIES AND MISCONCEPTIONS

BIOLOGY--(NERVOUS SYSTEM) RESEMBLES MANAGEMENT CONTROL, BUT NOT STRATEGIC PLANNING

> BIOLOGICAL ORGANISMS MUST ACCEPT THE SYSTEM AS IS
>
> AN ORGANIZATION CAN CHANGE ITS SYSTEM

GAME THEORY

> "STRATEGY" IN GAMES SPECIFIES EXACTLY WHAT ACTION WILL BE TAKEN UNDER ALL CONCEIVABLE CIRCUMSTANCES
>
> "STRATEGY" IN GAMES MORE AKIN TO MANAGEMENT CONTROL

LONG-RANGE PLANNING

> USUALLY IT MEANS LONG-RANGE PROJECTION OF THE PAST; STRATEGIC PLANNING DEALS WITH NOVEL OR NEW THRUSTS
>
> LONG-RANGE PLANNING IN MOST AGENCIES IS MOST AKIN TO MANAGEMENT CONTROL

MODELS

> SIMULATED MODELS ARE USEFUL IN STRATEGIC PLANNING
>
> MODELS ARE OF LIMITED USEFULNESS IN MANAGEMENT CONTROL

EXCESSIVELY BROAD GENERALIZATIONS--CAVEATS

MANAGEMENT CONTROL

"BRING ALL LEVELS OF SUPERVISION INTO THE ACT" APPLIES ONLY TO MANAGEMENT CONTROL.

"A SINGLE UNIFIED PLANNING AND CONTROL SYSTEM" APPLIES MAINLY TO MANAGEMENT CONTROL.

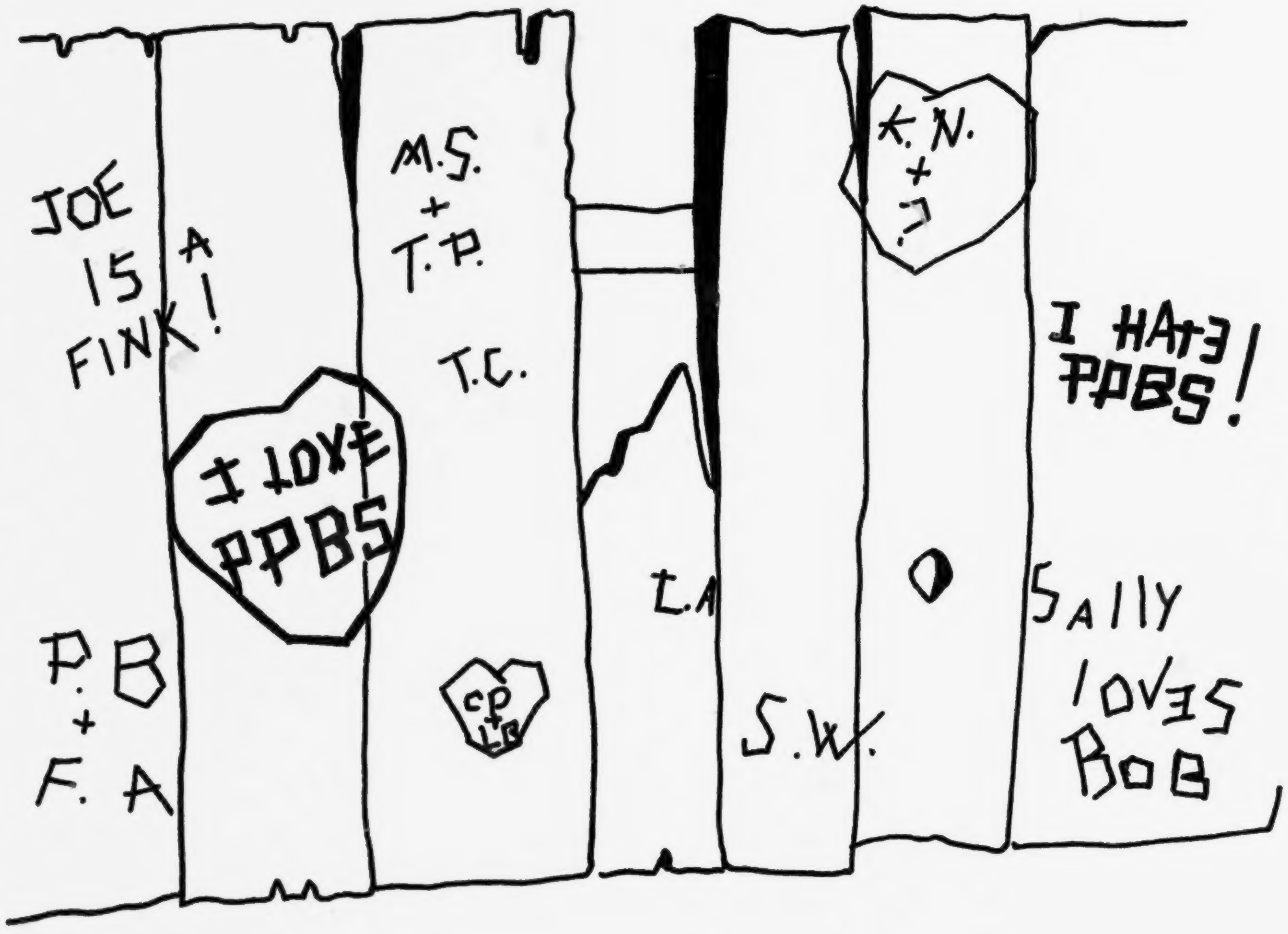
"THE PRESENT SYSTEM TENDS TO STIFLE CREATIVITY" APPLIES TO MANAGEMENT CONTROL.

"TIMETABLES AND PROCEDURES SHOULD BE UNIFORM" APPLIES MAINLY TO MANAGEMENT CONTROL.

STRATEGIC PLANNING

"MARGINAL OR INCREMENTAL COSTS SHOULD BE USED AT ALL LEVELS" APPLIES MAINLY TO STRATEGIC PLANNING SINCE OPERATING MANAGERS MAY BE WRONGLY MOTIVATED BY APPLYING THE PRINCIPLE; FOR EXAMPLE, MAKE OR BUY AND PRICING DECISIONS

"PLANNING WILL BE EMPHASIZED" MAY GIVE UNDUE ATTENTION TO PLANNING AT THE EXPENSE OF MANAGEMENT CONTROL; FOR EXAMPLE, THE DEFENSE DEPARTMENT


JOE IS A FINK!
I LOVE PPBS
P.B + F.A
M.S. + T.P.
T.C.
CP + LB
L.A
S.W.
K.N. + J.
I HATE PPBS!
Sally loves Bob

Relationship to PPBS

RELATIONSHIP TO PPBS

STRATEGIC PLANNING: RELATES PRIMARILY TO THE PLANNING PROCESS, AND SECONDARILY TO PROGRAMMING.

MANAGEMENT CONTROL: INCLUDES PROGRAMMING, BUDGETING SYSTEMS, AND IMPLEMENTATION OF PLANS AND POLICIES.

OPERATIONS CONTROL: RELATES ONLY TO IMPLEMENTATION OF SPECIFIC TASKS, PROGRAMS, AND POLICIES DECIDING UPON IN THE PLANNING, PROGRAMMING, BUDGETING SYSTEM.

EDUCATION AND THE ECONOMIC SYSTEM

A. *Objective.* The objective of this section is to provide the learner with knowledge and skills in concepts related to education in the economic system.

B. *Desired Outcomes.* If the general objective of this section has been achieved, the learner should be able to attain the following objectives:

1. Draw a chart depicting the elements of the economic system and the relationships which exist among these elements.
2. Identify the elements which form the conceptual basis of PPBS.
3. Draw a model which depicts the educational organization as a system and identifies the major subsystems of the organization.
4. Define the production process.
5. Identify the educational resources and products.
6. Differentiate between factor-factor relationships and factor relationships.
7. Identify product-product relationships.
8. Define what is meant by optimum benefits.
9. Identify the necessary conditions for linear programming.
10. Describe the importance of economic value to education.
11. State how an economic determination of value is reached.
12. Differentiate between final demand and intermediate demand.
13. Define supply and the law of supply.
14. Outline those factors that determine the shift in demand and a shift in supply.
15. Differentiate between price taker and price maker.
16. List those factors that account for the discrepancy between price and value.

C. *Prerequisite.* Satisfactory completion of the objectives outlined in Section 4 of a recent course in micro economics.

D. *Placement of Section in Sequence.* While this section may be used independently, the learners should have knowledge of basic statistics before taking this section.

E. *Pre-evaluation.* The learner may be asked to demonstrate achievement of the specific objectives in Section 4.

F. *Minimum Time Estimate.* Approximately three to six hours (in class) should be devoted to learning activity designed to reach a satisfactory level of performance for this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Economics	
a. Elements of System	213
b. Basis of PPBS	214
2. The Production Process	215-218
a. Factor-Factor Relationships	219-223
b. Factor-Product Relationships	224-227
c. Product-Product Relationships	228-231
d. Assumptions	232
e. Implications	233
3. Linear Programming Example	234-239
4. The Market System	240, 241
a. Determination of Demand	242-245
b. Determination of Supply	246-250
c. Determination of Value	251-253
d. Limitations of Prices	254

H. *Suggested Instructional Activities.*

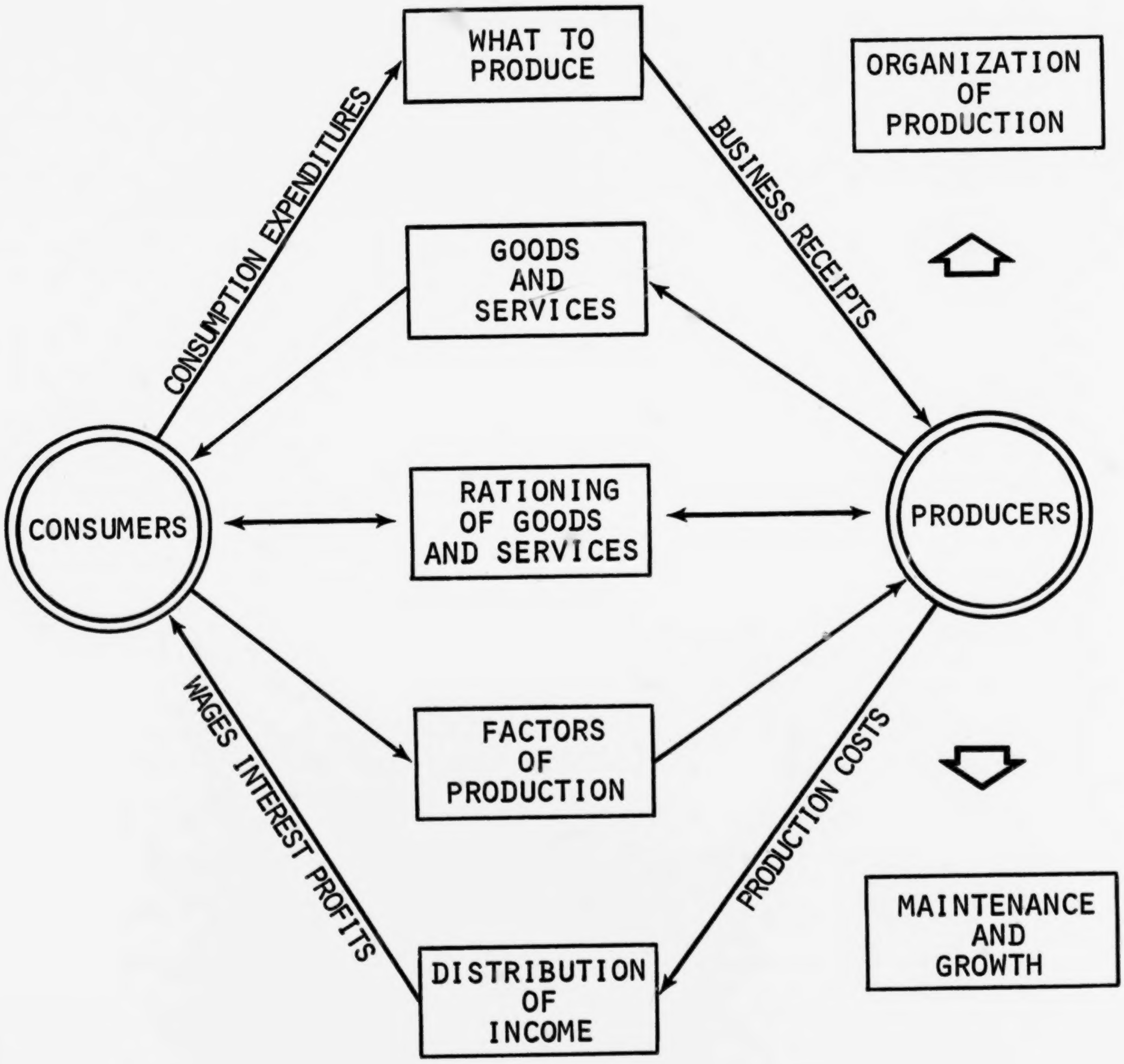
1. Lecture-discussion for large or small groups may be utilized in presenting the major concepts of this section. Transparencies of the charts may be produced to enhance the lecture-discussion process.
2. Learners may be given the problem included in the section for completion.
3. Learners may be asked to analyze a hypothetical educational system in relation to its production, inputs, etc.

I. *Reference Materials.*

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume II: A Case Problem* (Columbus: The Center for Vocational and Technical Education, 1969).
3. C. E. Ferguson, *Microeconomic Theory* (Homewood, Illinois: Irwin, Inc., 1966).
4. Paul A. Samuelson, *Economics: An Introductory Analysis* (New York: McGraw-Hill Book Co., 1964).
5. A. R. Prest and Ralph Turvey, "Cost-Benefit Analysis: A Survey," *Economic Journal* (December 1965), pp. 683-735.

J. *Instructional Aids*--pages 213 through 254.

ECONOMIC SYSTEM


WHAT TO PRODUCE
ORGANIZATION OF PRODUCTION
CONSUMPTION EXPENDITURES
BUSINESS RECEIPTS
GOODS AND SERVICES
CONSUMERS
RATIONING OF GOODS AND SERVICES
PRODUCERS
WAGES INTEREST PROFITS
FACTORS OF PRODUCTION
PRODUCTION COSTS
MAINTENANCE AND GROWTH
DISTRIBUTION OF INCOME

REAL FLOW: COUNTERCLOCKWISE
MONETARY FLOW: CLOCKWISE

A CONCEPTUAL BASIS OF PPBS

ECONOMICS: THE SOCIAL SCIENCE THAT IS CONCERNED WITH THE ALLOCATION OF SCARCE RESOURCES TO ATTAIN THE MAXIMUM SATISFACTION OF OUR UNLIMITED WANTS

PURPOSE OF ECONOMIC THEORY: PROVIDES A GENERAL FRAMEWORK FOR THE ANALYSIS OF:

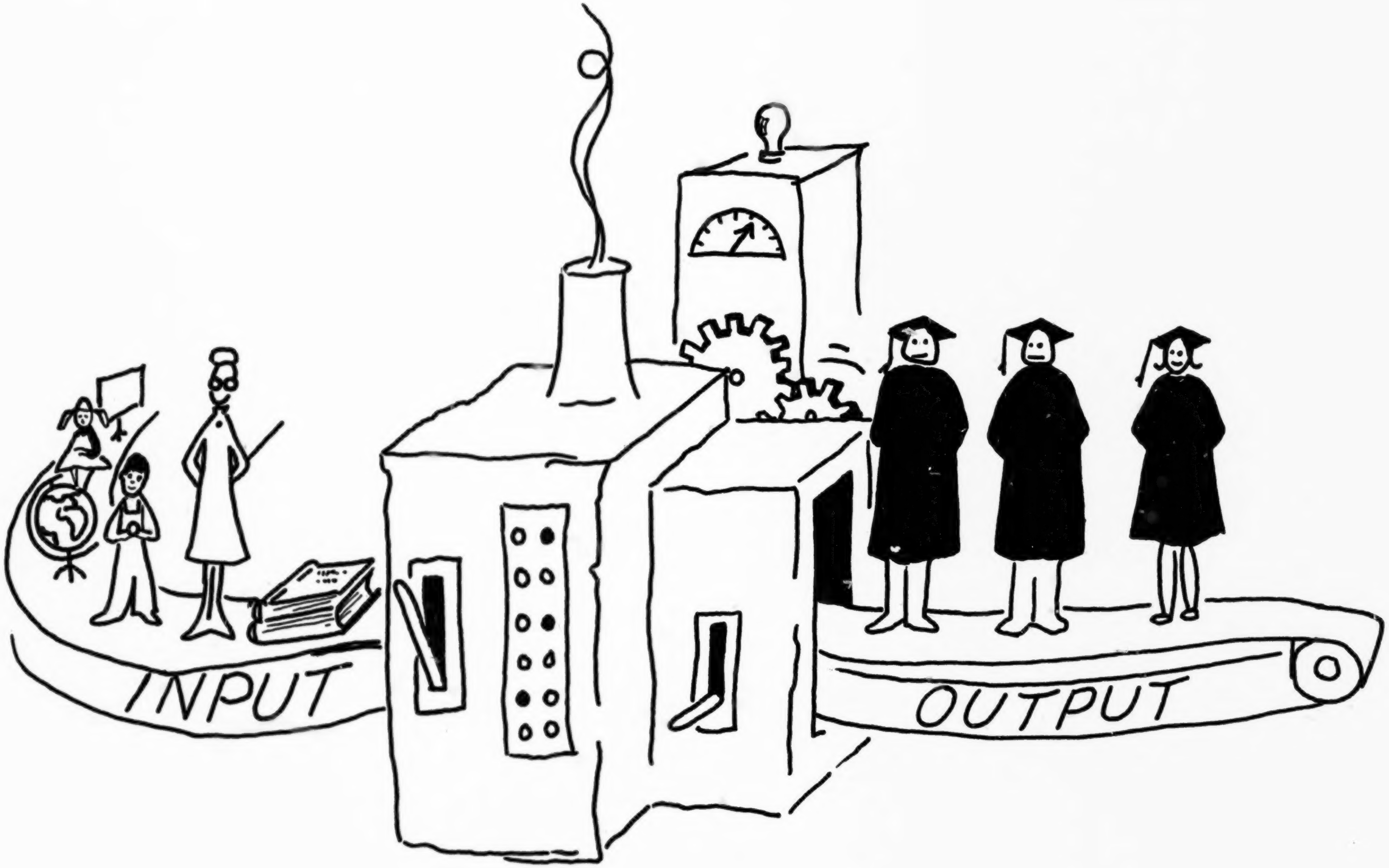
RESOURCE ALLOCATION--WHAT IS THE BEST COMBINATION OF INPUTS TO PRODUCE A GIVEN LEVEL OF AN OUTPUT?

PRODUCT DETERMINATION--WHAT IS THE BEST COMBINATION OF OUTPUTS TO PRODUCE?

DETERMINATION OF VALUE--WHAT IS THE VALUE (PRICES) OF INPUTS AND OUTPUTS?

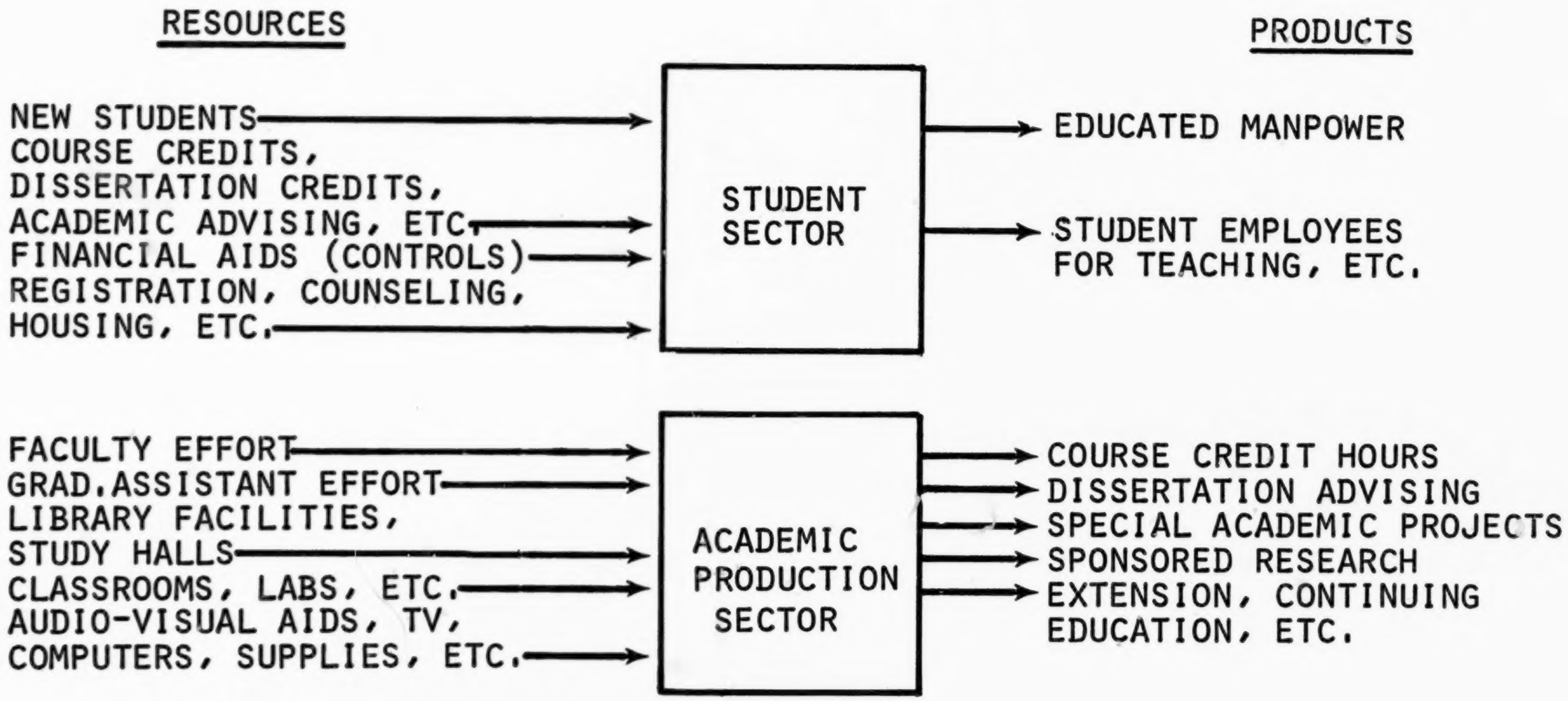
IMPORTANCE OF ECONOMIC CONCEPTS IN PPBS

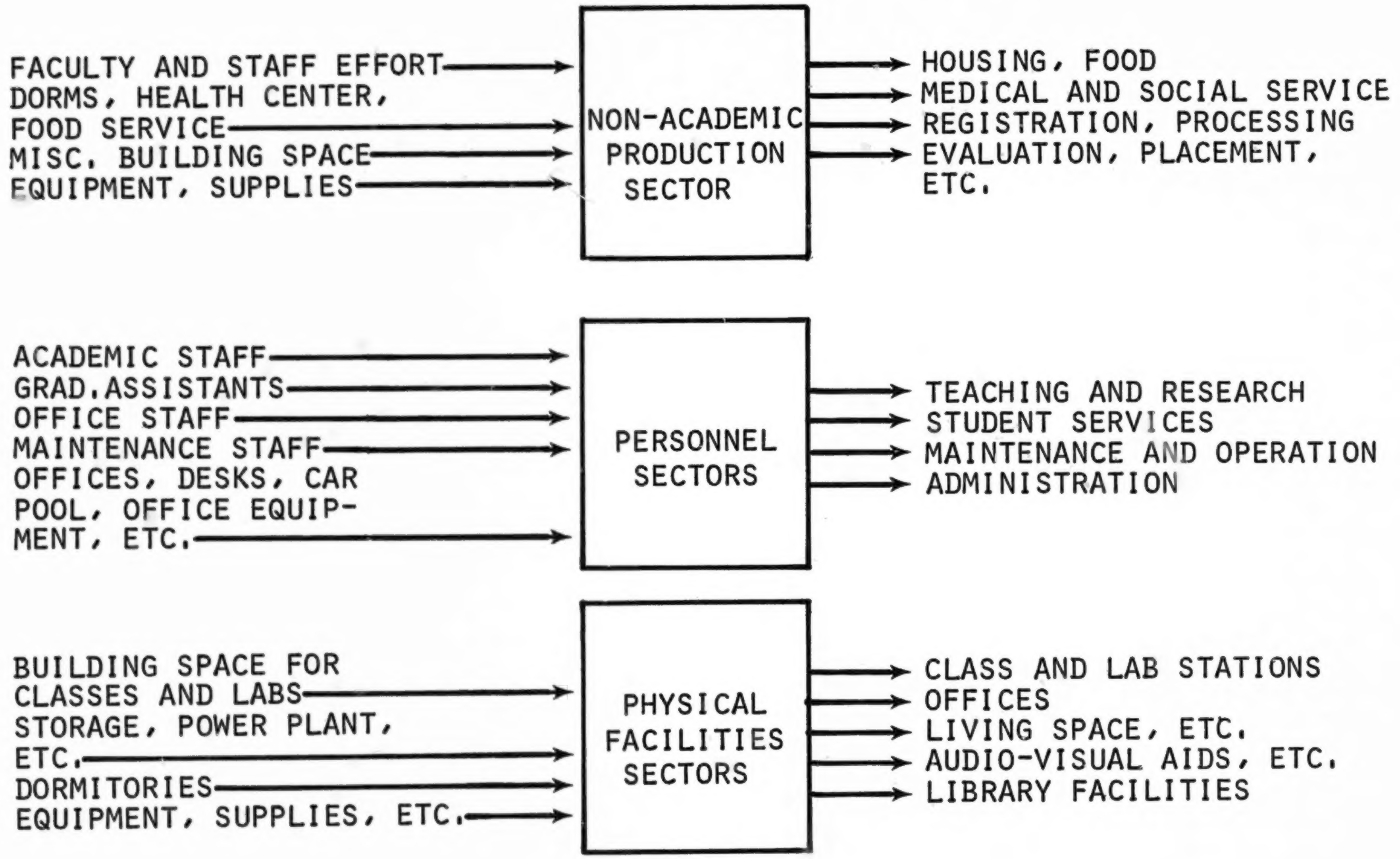
PLANNING:	VERY IMPORTANT IN EVALUATING ALTERNATIVE OBJECTIVES AND DESIGNING AND EVALUATING PROGRAMS THROUGH THE COMPARISON OF THEIR BENEFITS AND COSTS TO SOCIETY
PROGRAMMING:	IMPORTANT IN ALLOCATING RESOURCES WITHIN AND BETWEEN PROGRAMS
BUDGETING:	LITTLE IMPORTANCE


INPUT
OUTPUT

The Production Process

EDUCATIONAL INPUTS AND OUTPUTS


RESOURCES
PRODUCTS
NEW STUDENTS
COURSE CREDITS, DISSERTATION CREDITS, ACADEMIC ADVISING, ETC.
FINANCIAL AIDS (CONTROLS)
REGISTRATION, COUNSELING, HOUSING, ETC.
STUDENT SECTOR
EDUCATED MANPOWER
STUDENT EMPLOYEES FOR TEACHING, ETC.
FACULTY EFFORT
GRAD.ASSISTANT EFFORT
LIBRARY FACILITIES, STUDY HALLS
CLASSROOMS, LABS, ETC.
AUDIO-VISUAL AIDS, TV, COMPUTERS, SUPPLIES, ETC.
ACADEMIC PRODUCTION SECTOR
COURSE CREDIT HOURS
DISSERTATION ADVISING
SPECIAL ACADEMIC PROJECTS
SPONSORED RESEARCH
EXTENSION, CONTINUING EDUCATION, ETC.


FACULTY AND STAFF EFFORT
DORMS, HEALTH CENTER, FOOD SERVICE
MISC. BUILDING SPACE
EQUIPMENT, SUPPLIES
NON-ACADEMIC PRODUCTION SECTOR
HOUSING, FOOD
MEDICAL AND SOCIAL SERVICE
REGISTRATION, PROCESSING
EVALUATION, PLACEMENT, ETC.
ACADEMIC STAFF
GRAD.ASSISTANTS
OFFICE STAFF
MAINTENANCE STAFF
OFFICES, DESKS, CAR POOL, OFFICE EQUIPMENT, ETC.
PERSONNEL SECTORS
TEACHING AND RESEARCH
STUDENT SERVICES
MAINTENANCE AND OPERATION
ADMINISTRATION
BUILDING SPACE FOR CLASSES AND LABS
STORAGE, POWER PLANT, ETC.
DORMITORIES
EQUIPMENT, SUPPLIES, ETC.
PHYSICAL FACILITIES SECTORS
CLASS AND LAB STATIONS
OFFICES
LIVING SPACE, ETC.
AUDIO-VISUAL AIDS, ETC.
LIBRARY FACILITIES

SOURCE: H. KOENIG, M. KEENEY, AND R. ZEMECH, "SYSTEMS ANALYSIS AND PLANNING IN UNIVERSITY ADMINISTRATION," MICHIGAN STATE UNIVERSITY, EAST LANSING, 1967.

THE PRODUCTION PROCESS

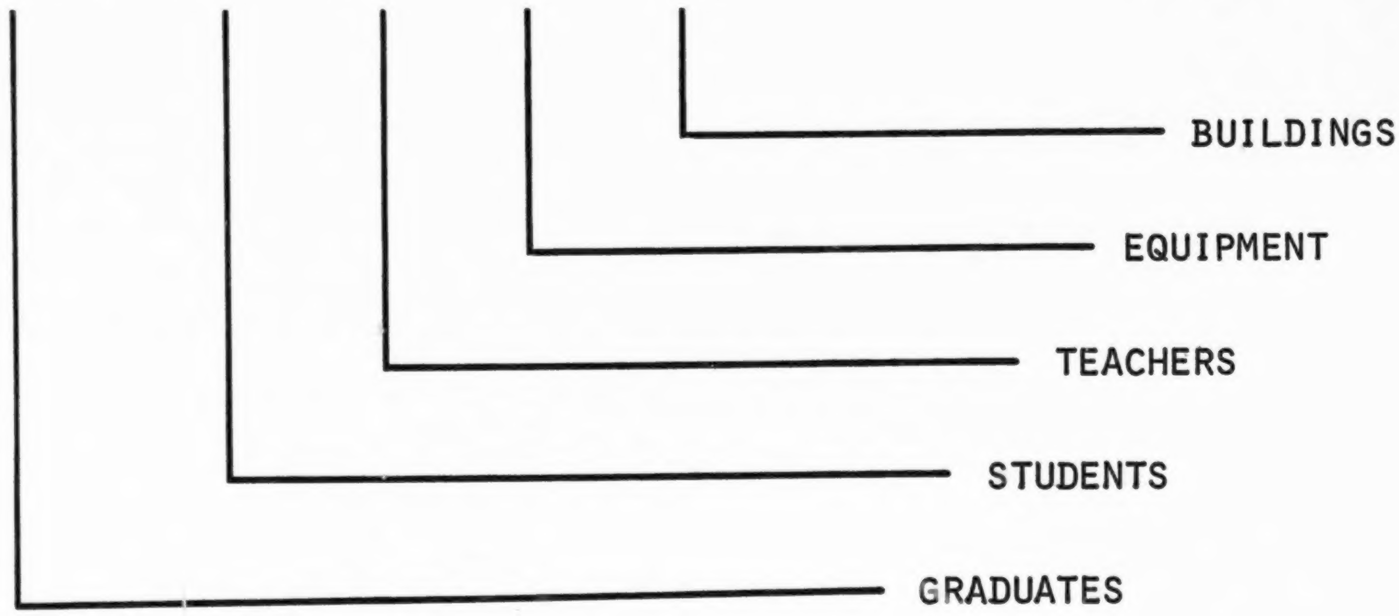
DEFINITIONS

PRODUCTION: PROCESS OF TRANSFORMING SOME GOODS AND SERVICES (INPUT) INTO OTHER GOODS AND SERVICES (OUTPUT) WHICH INCLUDE:

CHANGES IN FORM
CHANGES IN LOCATION
CHANGES IN TIME

PRODUCTION FUNCTION: THE MATHEMATICAL RELATIONSHIP BETWEEN FACTORS OF PRODUCTION (INPUT) AND PRODUCTS OF THE PRODUCTION PROCESS (OUTPUT)

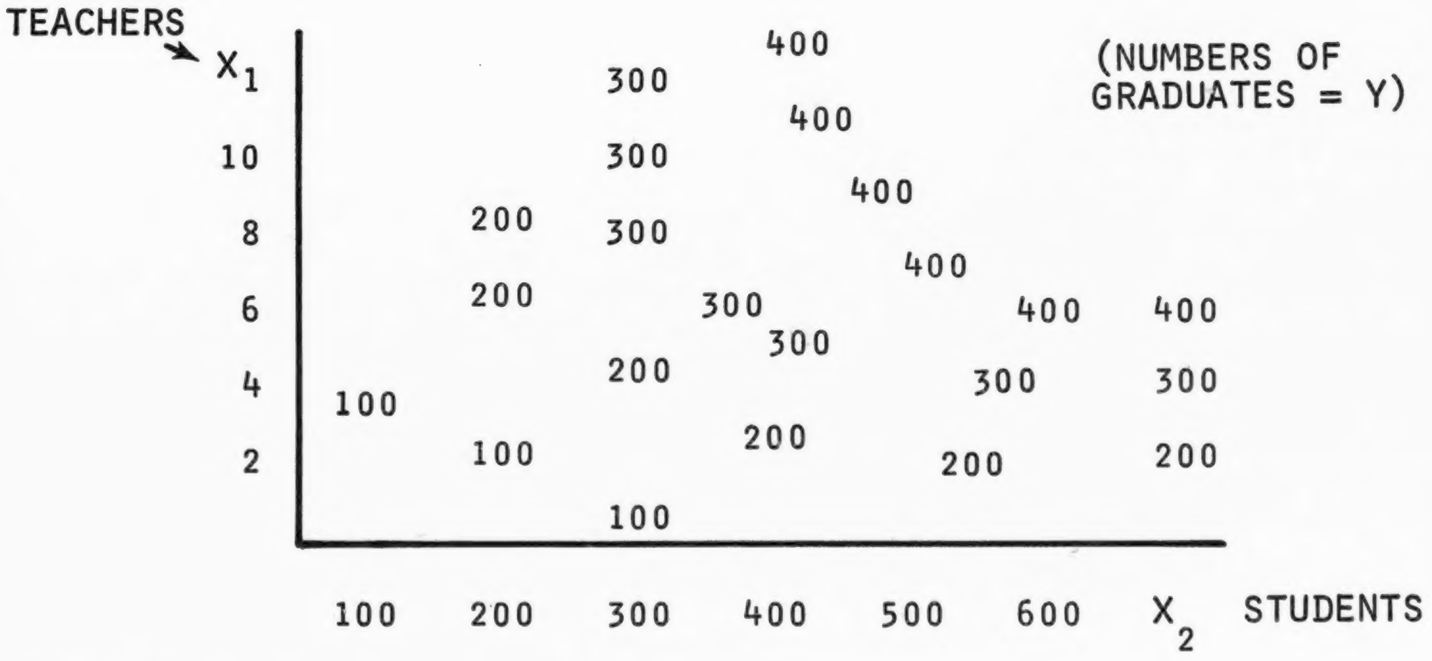
$$Y = F \quad (X \quad X_2 \quad X_3 \quad X_4)$$

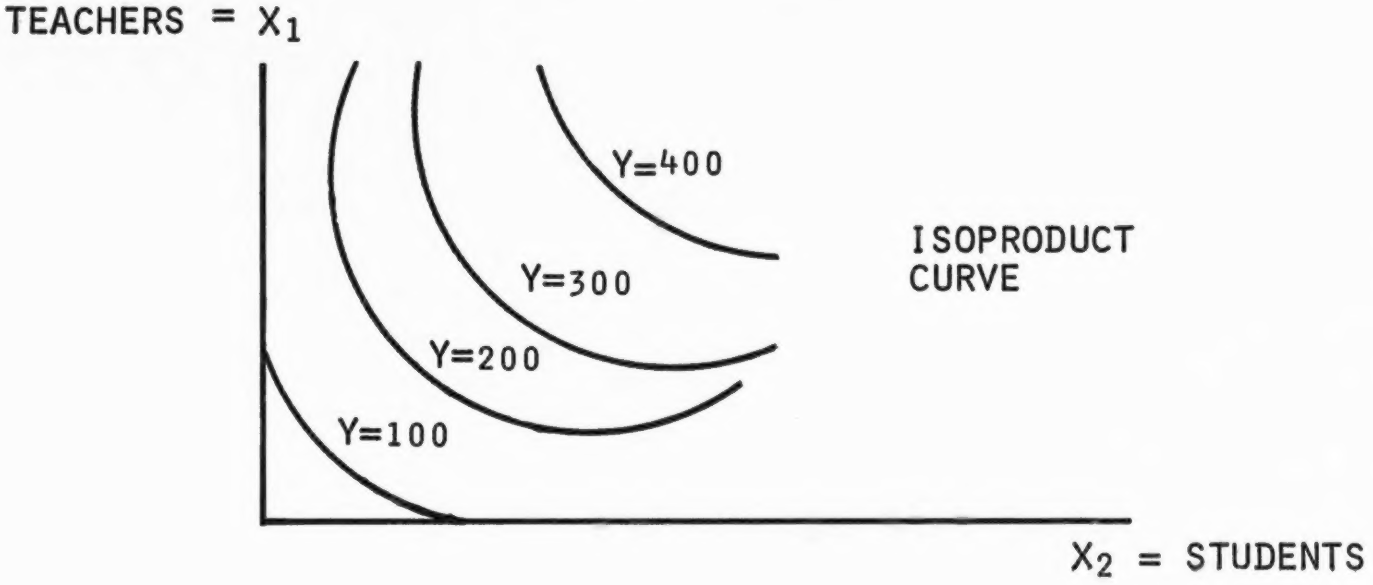

BUILDINGS
EQUIPMENT
TEACHERS
STUDENTS
GRADUATES

FACTOR-FACTOR RELATIONSHIP: "HOW TO PRODUCE?"

PURPOSE: TO FIND THE MOST EFFICIENT COMBINATION OF INPUTS TO PRODUCE A PRODUCT.

ISOPRODUCT CURVE: VARIOUS COMBINATIONS OF INPUTS WHICH PRODUCE A CONSTANT QUALITY AND QUANTITY OF AN OUTPUT.



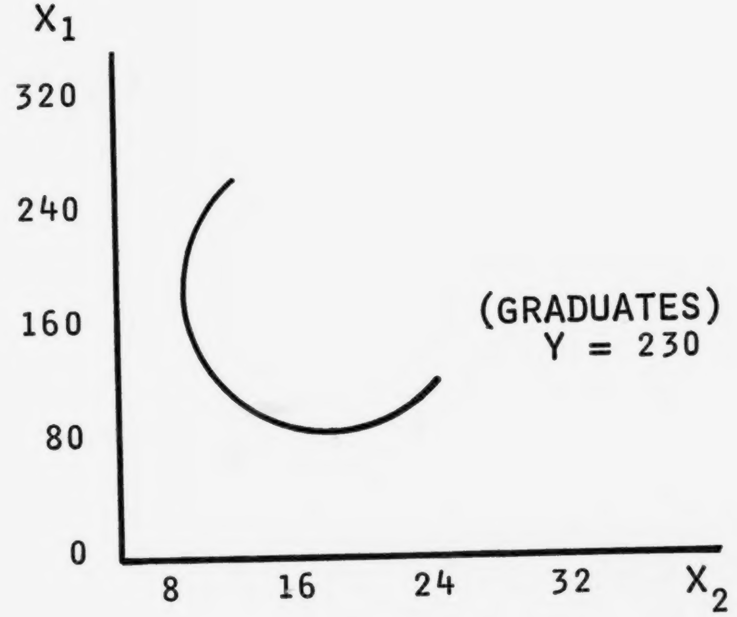


MARGINAL RATE OF SUBSTITUTION (MRS)

DEFINITION: THE RATE WHICH INPUTS SUBSTITUTE FOR EACH OTHER ALONG AN ISOPRODUCT CURVE: THE SLOPE OF THE ISOPRODUCT CURVE.

EXAMPLE: $Y = f\,(X_1 \quad X_2 \quad X_3 \quad X_4)$

X_4 — BUILDINGS, EQUIPMENT, ETC.
X_3 — 300 STUDENTS
X_2 — NUMBER OF TEACHERS
X_1 — NUMBER OF INDIVIDUAL LEARNING CENTERS
Y — NUMBER OF GRADUATES = 230



Y = 230				M R S	(-) I P R
X_1	ΔX_1	X_2	ΔX_2	$\Delta X_1 / \Delta X_2$	$(-)\ P_{x_2} / P_{x_1} = \frac{\$6000}{\$400}$
75		20.0			
	+5		-2.0	-2.5	15.0
80		18.0			
	+7		-2.0	-3.5	15.0
87		16.0			
	+8		-2.0	-4.0	15.0
95		14.0			
	+15		-2.0	-7.5	15.0
110		12.0			
	+10		-1.0	-10.0	15.0
120		11.0			
	+20		-1.5	-13.33	15.0
140		9.5			
	+20		-0.75	-16.00	15.0
160		8.75			
	+20		-0.75	-26.66	15.0
180		8.0			
	+20		-.50	-40.00	15.0
200		7.5			

BUDGET LINE

DEFINITION: ISOCOST LINE; VARIOUS COMBINATIONS OF INPUTS WHICH HAVE A CONSTANT TOTAL COST; SLOPE OF BUDGET LINE EQUALS THE INVERSE PRICE RATIO (I P R).

GIVEN: COST OF AN INDIVIDUAL LEARNING CENTER = \$400 = Px_1

COST OF A TEACHER =\$6000 = Px_2

TOTAL BUDGET = \$113,000.00

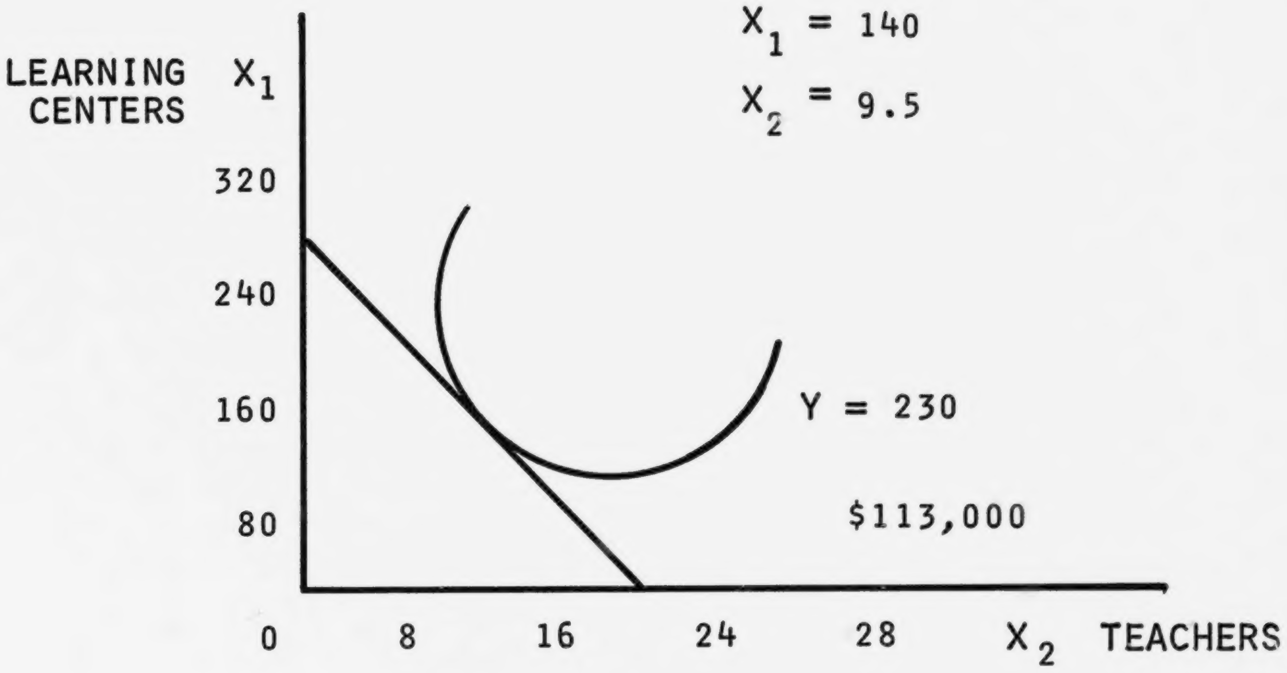
THEREFORE IF $X_1 = 0$, $X_1 = 18.33$

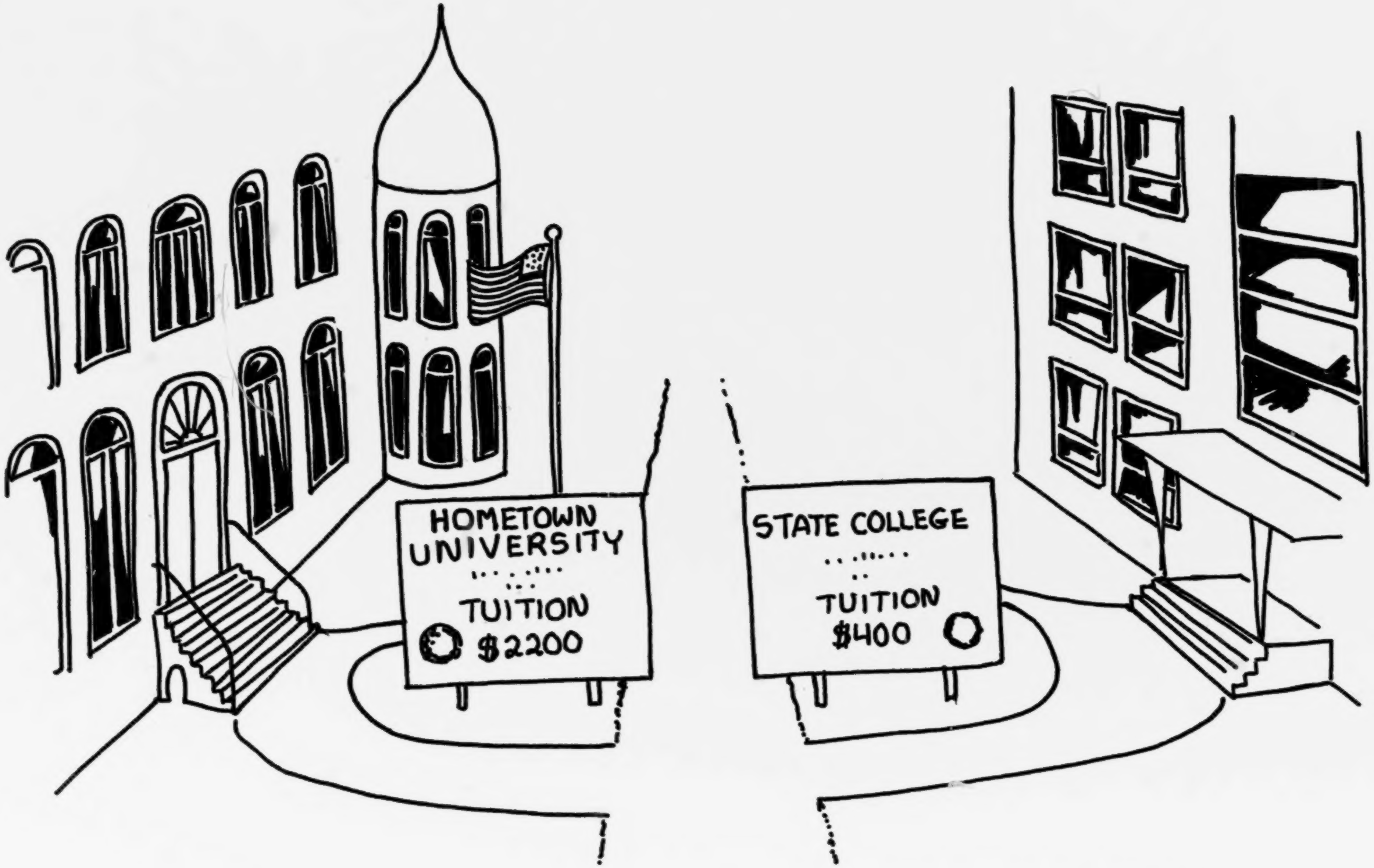
IF $X_2 = 0$, $X_2 = 282.5$

OPTIMUM COMBINATION:

$X_1 = 140$

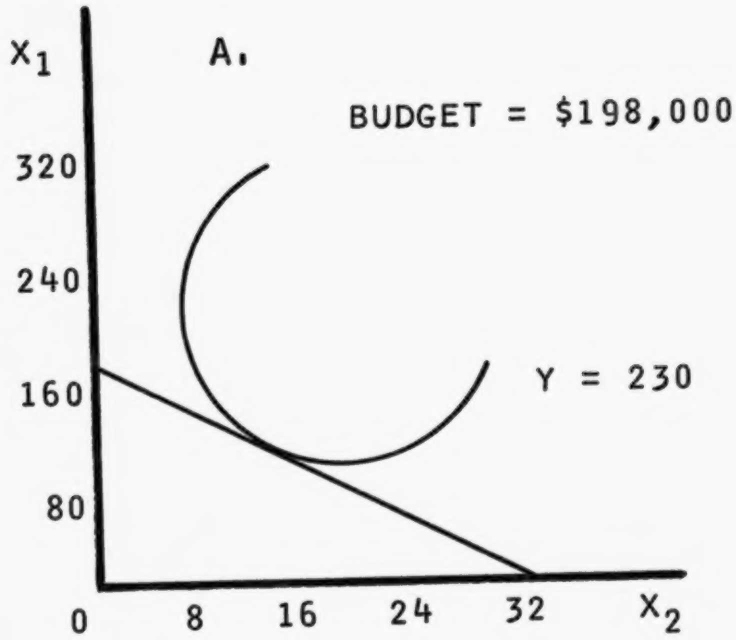
$X_2 = 9.5$

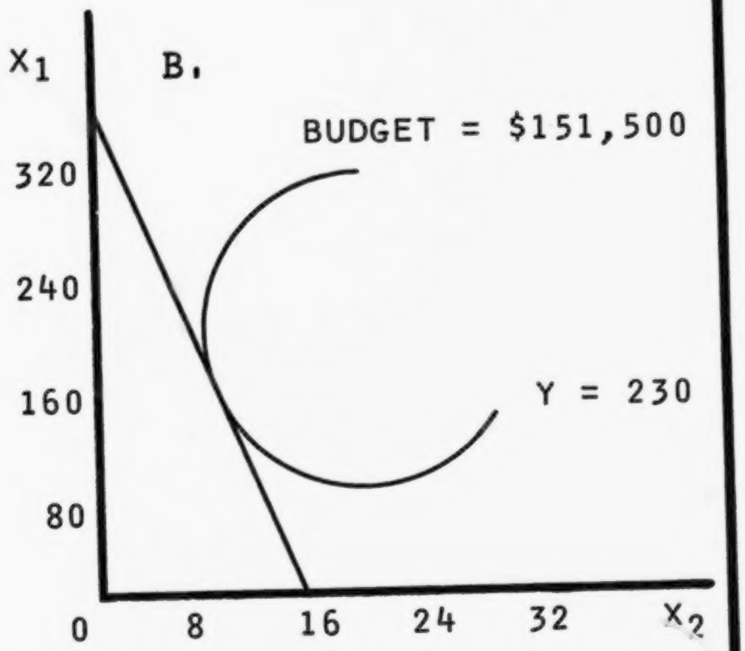



HOMETOWN UNIVERSITY
TUITION
$2200
STATE COLLEGE
TUITION
$400

Price Relationships

PRICE RELATIONSHIPS





Y = GRADUATES
X_1= LEARNING CENTERS
X_2= TEACHERS

Y = 230		MRS	A.	B.
X_1	X_2	$\Delta X_1 / \Delta X_2$	-IPR P_{x2} / P_{x1}	-IPR P_{x2} / P_{x1}
75	20.0	-2.5	$\frac{\$6000}{1200}$	$\frac{\$10,000}{400}$
80	18.0	-3.5	= 5	= 25
87	16.0	-4.0		
95	14.0	-7.5		
100	12.0	-10.0		
120	11.0	-13.33		
140	9.5	-16.00		
160	8.75	-26.26		
180	8.0	-40.00		
200	7.5		↓	↓

FACTOR-PRODUCT RELATIONSHIP: "HOW TO PRODUCE?"

PURPOSE: TO FIND THE MOST PROFITABLE QUANTITY OF AN INPUT TO USE IN THE PRODUCE PROCESS IF ALL OTHER INPUTS ARE HELD CONSTANT.

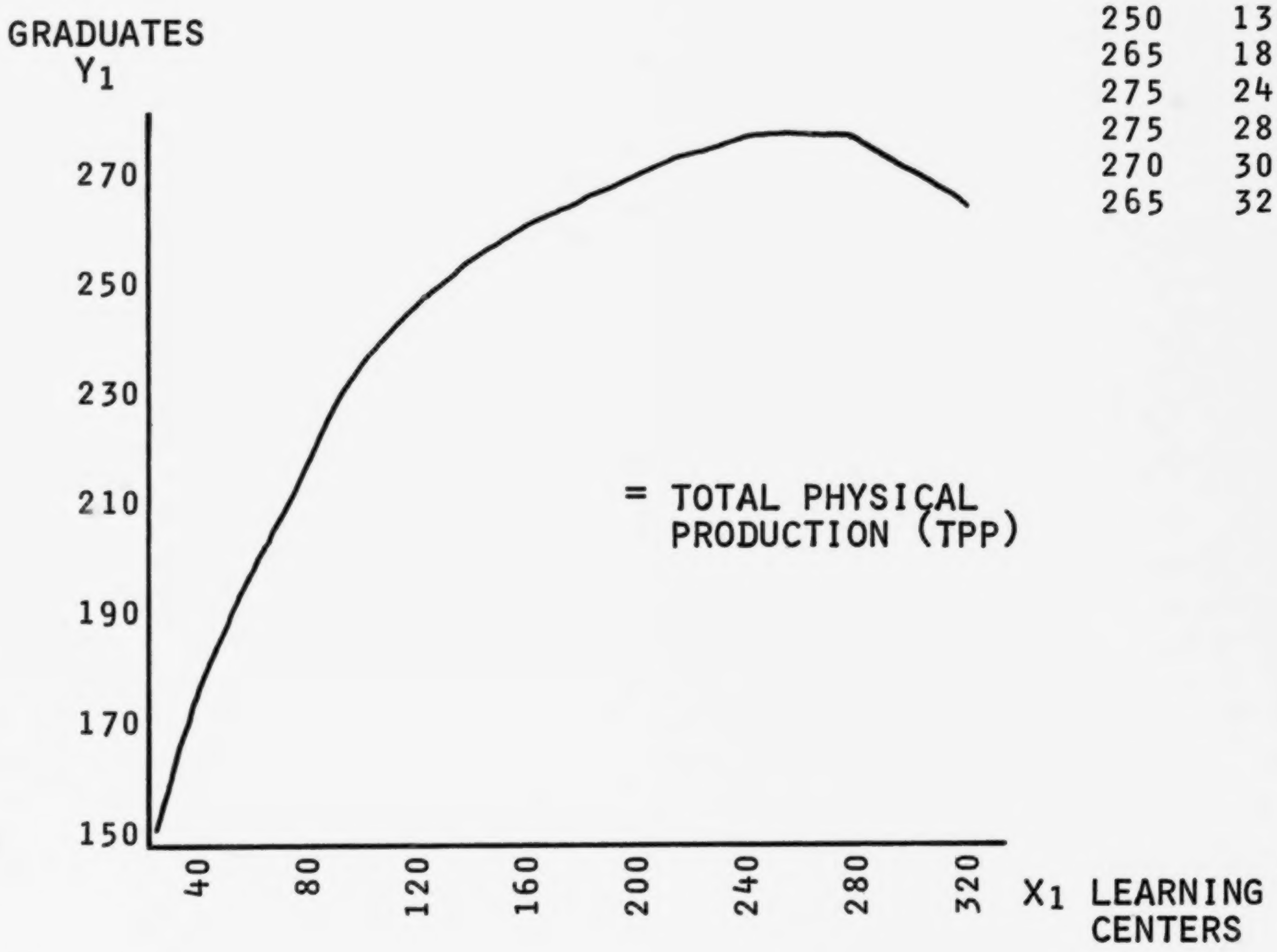
EXAMPLE: $Y = f\,(X_1 \;\; X_2 \;\; X_3 \;\; X_4)$

X_4 — BUILDINGS, ETC.
X_3 — 300 STUDENTS
X_2 — 14 TEACHERS
X_1 — NUMBER OF INDIVIDUAL LEARNING CENTERS
Y — NUMBER OF GRADUATES

VARIABLE: X_1

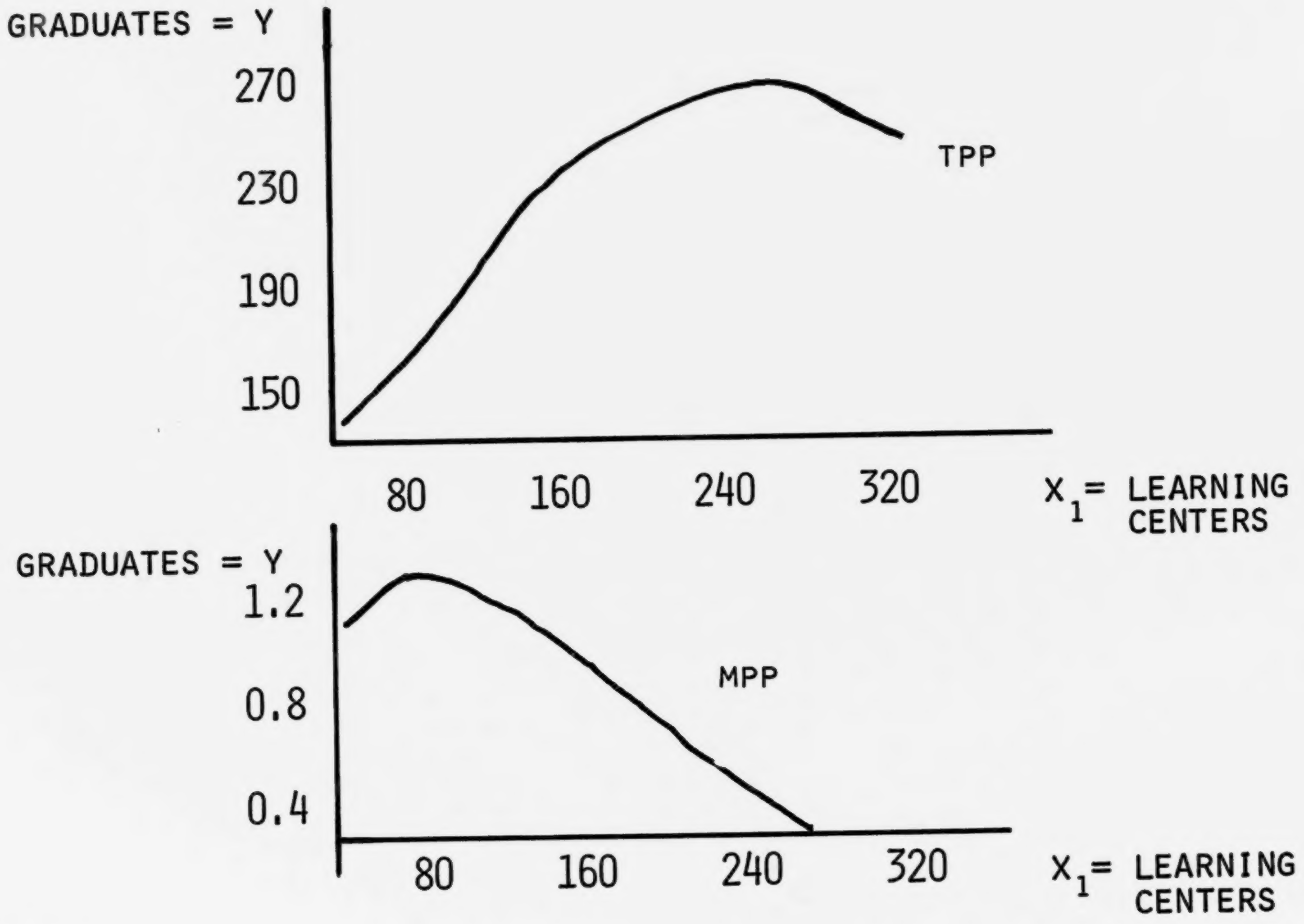
FIXED: X_2, X_3, X_4

Y_1	X_1
150	18
175	40
205	65
230	90
250	130
265	180
275	240
275	280
270	300
265	320



MARGINAL PHYSICAL PRODUCT (MPP)

DEFINITION: THE QUANTITY OF ADDITIONAL PRODUCT PRODUCED BY EACH ONE-UNIT CHANGE IN A VARIABLE FACTOR.



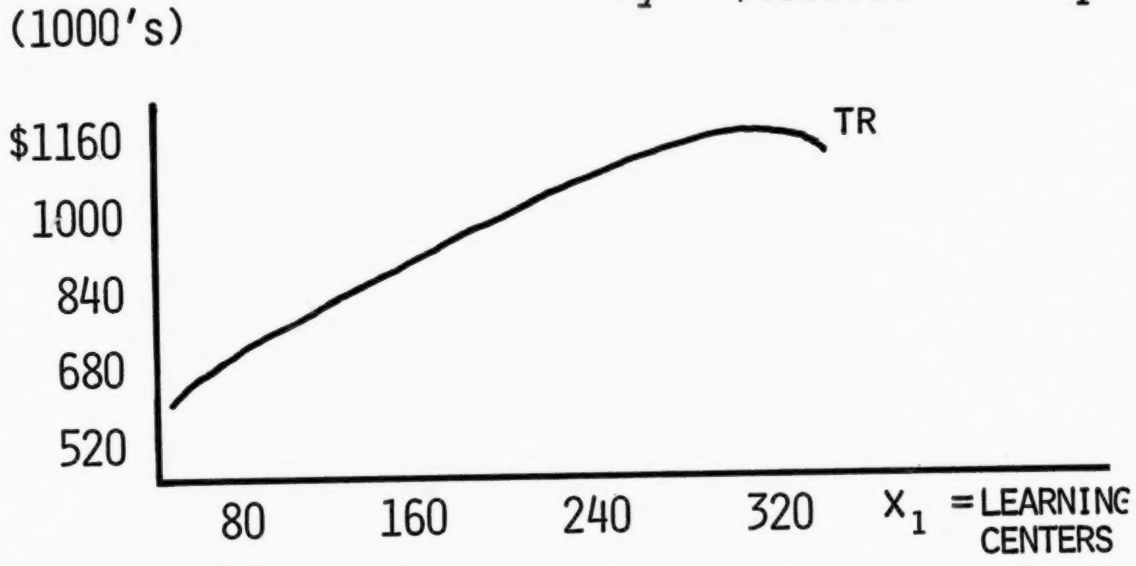
Y	X_1	MPP $\Delta Y / \Delta X_1$
150	18	
175	40	1.18
205	65	1.20
230	90	1.00
250	130	0.50
265	180	0.33
275	240	0.17
275	280	0.00
270	300	-0.25
265	320	-0.25

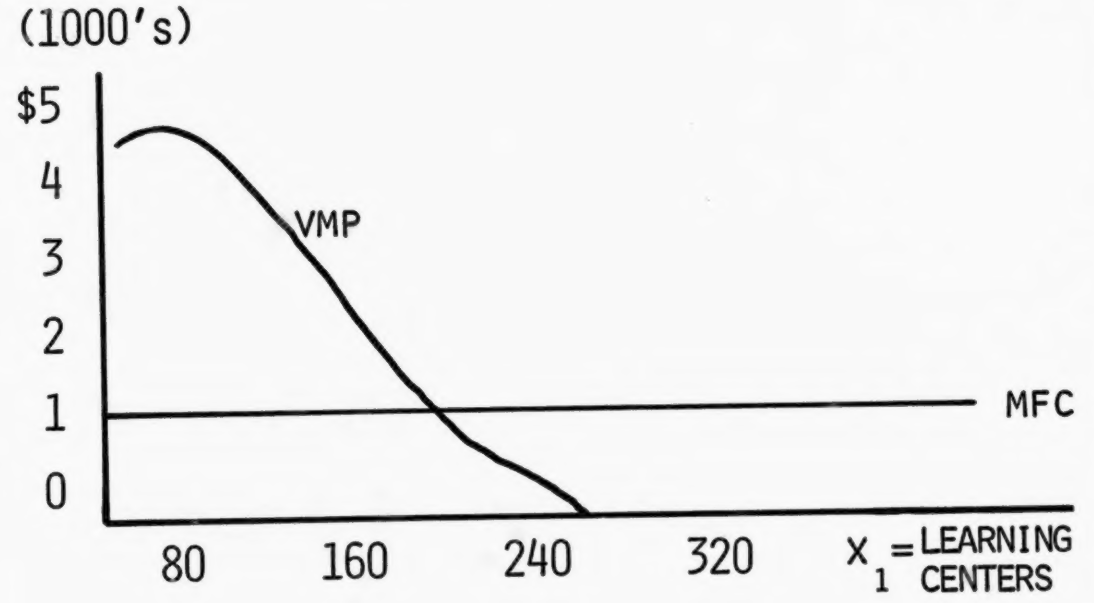
OPTIMUM: VMP ≥ MFC

VALUE OF THE MARGINAL PRODUCT = THE VALUE OF THE ADDITION TO TOTAL REVENUE MADE BY ONE UNIT OF INPUT

MARGINAL FACTOR COST = THE VALUE OF THE ADDITION TO TOTAL COST MADE BY ONE UNIT OF INPUT

$P_y = \$4000.00$ $P_{x_1} = \$1000.00$



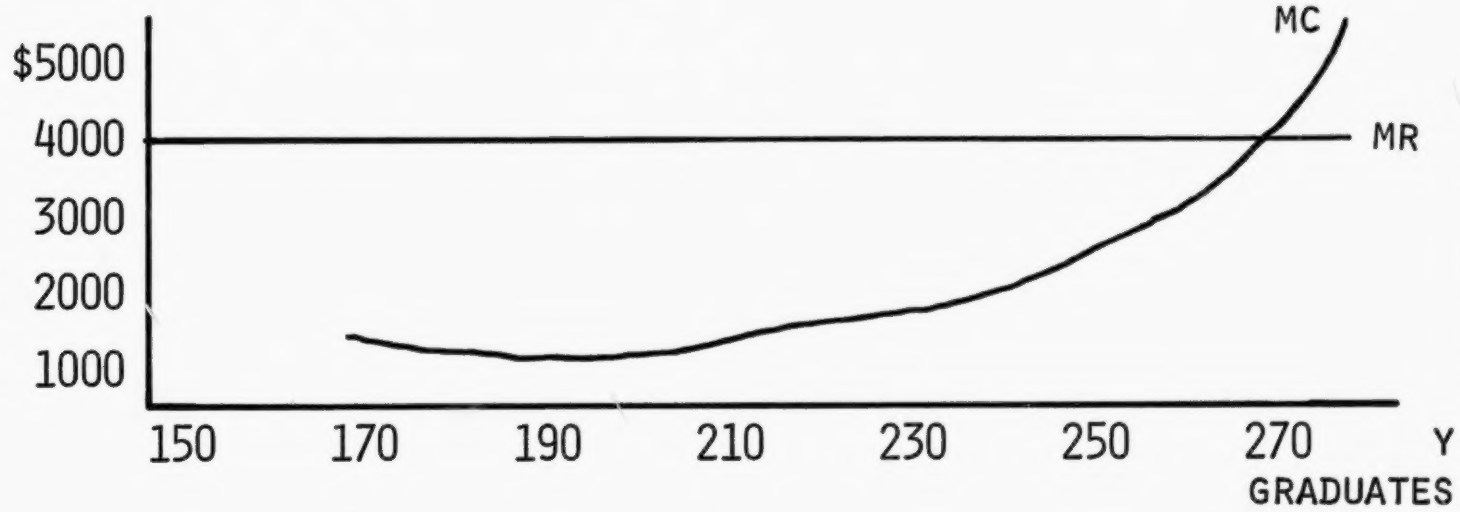


Y	X_1	TR (1000)	TVC (1000)	VMP $\Delta TR / \Delta X_1$	MFC $\Delta TVC / \Delta X_1$
150	18	$ 600	$ 18.0		
175	40	700	40.0	$4,560	$1,000
205	65	820	65.0	4,800	1,000
230	90	920	90.0	4,000	1,000
250	130	1000	130.0	3,000	1,000
265	180	1060	180.0	1,200	1,000
275	240	1100	240.0	666	1,000
275	280	1100	280.0	000	1,000
270	300	1080	300.0	-1,000	1,000
265	320	1060	320.0	-1,000	1,000

OPTIMUM: MR ≥ MC

MARGINAL REVENUE = THE VALUE OF THE ADDITION TO TOTAL REVENUE MADE BY ONE UNIT OF OUTPUT

MARGINAL COST = THE VALUE OF THE ADDITION TO TOTAL COST MADE BY ONE UNIT OF OUTPUT

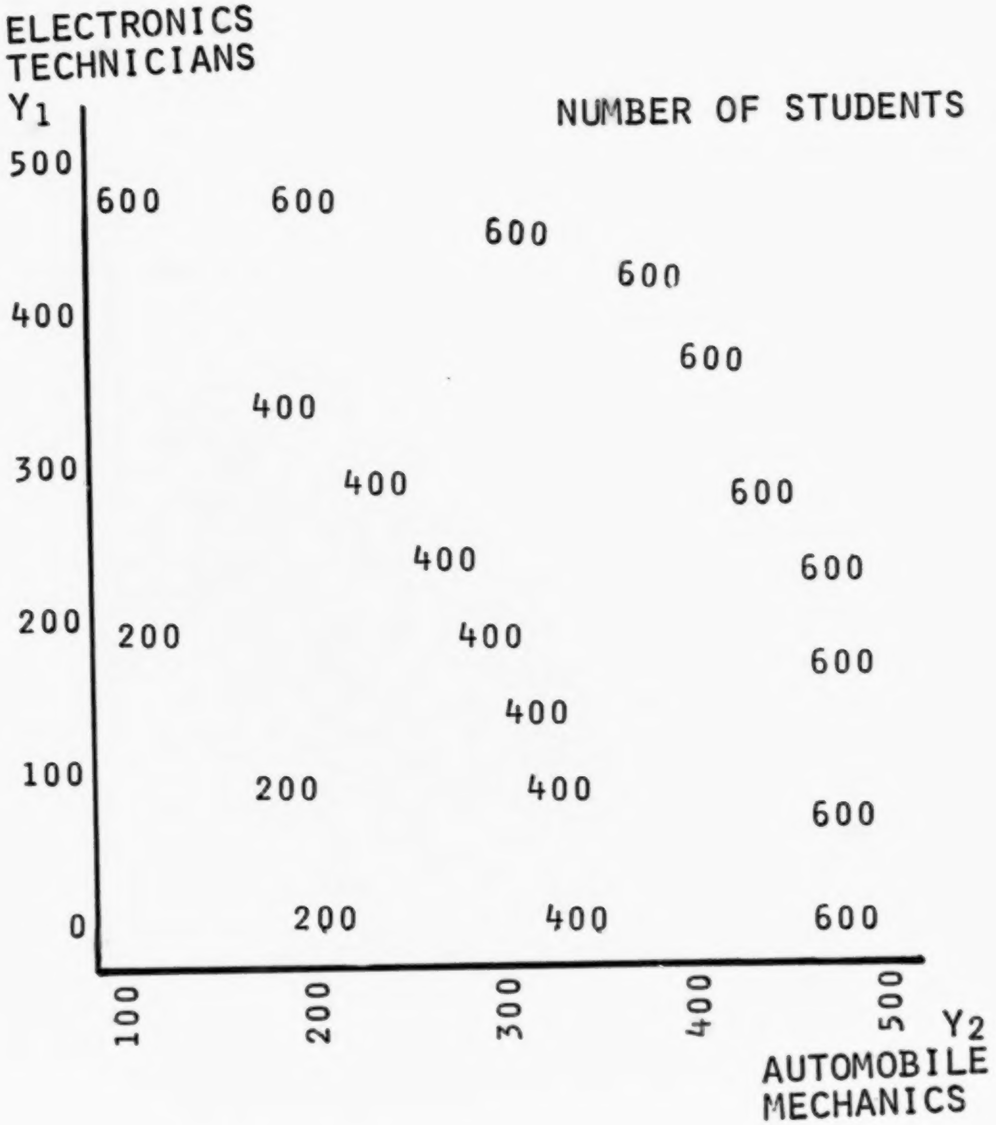


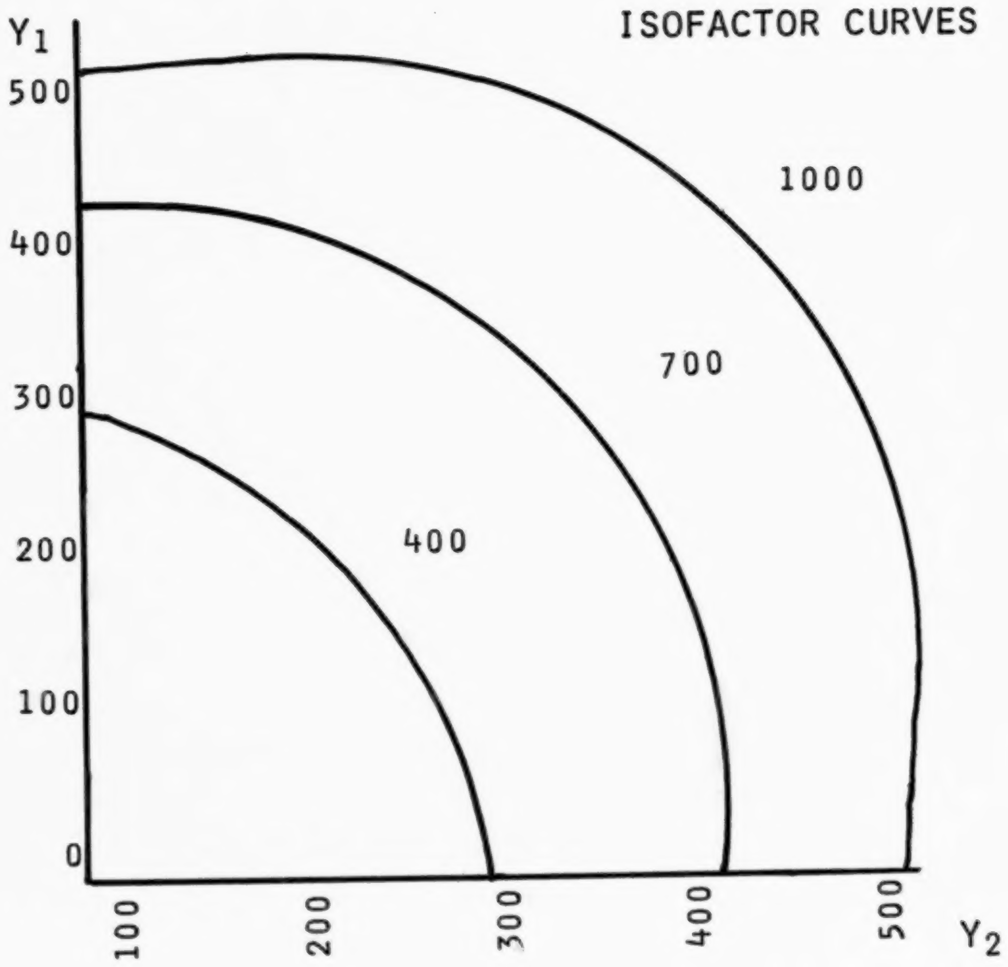
Y	X_1	TR (1000)	TVC (1000)	MR $\Delta TR / \Delta Y$	MC $\Delta TC / \Delta Y$
150	18	$600	$18	$4000	$880
175	40	700	40	4000	833
205	65	820	65	4000	1000
230	90	920	90	4000	2000
250	130	1000	130	4000	3333
265	180	1060	180	4000	6000
275	240	1100	240	4000	∞
275	280	1100	280	4000	
270	300	1080	300	4000	
265	320	1060	320	4000	

PRODUCT-PRODUCT RELATIONSHIP: "WHAT TO PRODUCE?"

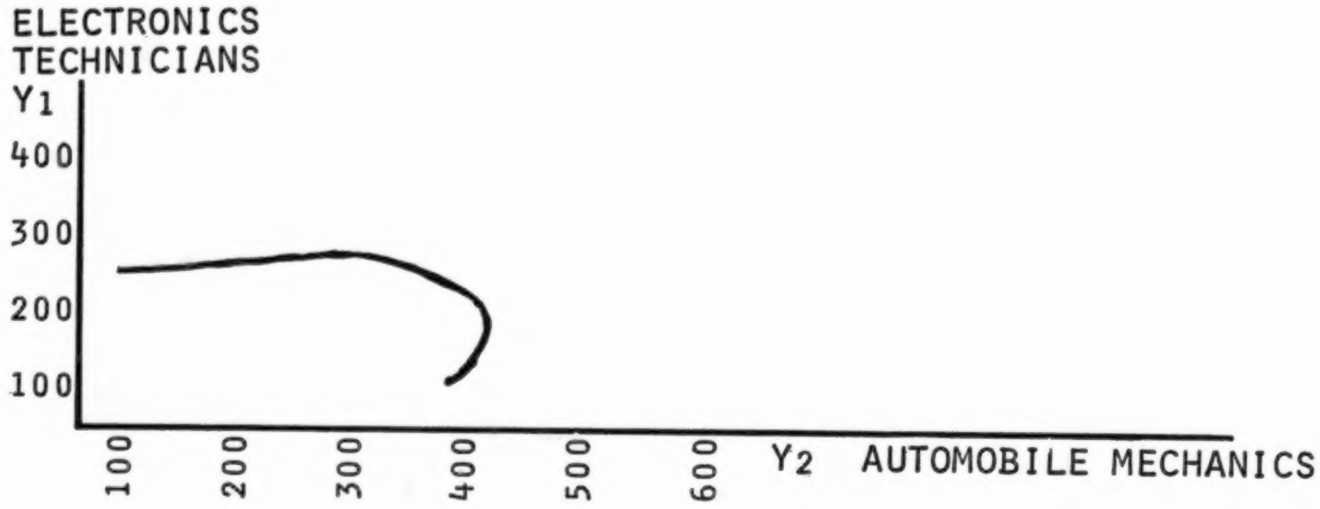
PURPOSE: TO FIND THE MOST PROFITABLE COMBINATIONS OF PRODUCTS WHICH CAN BE PRODUCED BY A GIVEN SET OF INPUTS

ISOFACTOR CURVE: VARIOUS COMBINATIONS OF PRODUCTS WHICH CAN BE PRODUCED BY FIXED SET OF INPUTS





MARGINAL RATE OF SUBSTITUTION (MRS): THE RATE WHICH PRODUCTS SUBSTITUTE FOR EACH OTHER ALONG AN ISOFACTOR CURVE; THE SLOPE OF THE ISOFACTOR CURVE



$Y_1 = f(X_1)$		$Y_2 = f(X_1)$		X_1	Y_1	Y_2	MRS $\Delta Y_1 / \Delta Y_2$
Y_1	X_1	Y_2	X_1				
125	0	100	0	320	125	400	+2.50
150	18	200	20	320	150	410	+2.50
175	40	260	40	320	175	420	-3.00
205	65	305	80	320	205	410	-2.50
230	90	345	140	320	230	400	-0.80
250	130	375	190	320	250	375	-0.50
265	180	400	230	320	265	345	-0.25
275	240	410	255	320	275	305	-0.00
275	280	420	280	320	275	260	+0.08
270	300	410	302	320	270	200	+0.05
265	320	400	320	320	265	100	

REVENUE LINE: ISOPROFIT LINE; VARIOUS COMBINATIONS OF PRODUCTS WHICH HAVE A CONSTANT TOTAL REVENUE; SLOPE OF THE REVENUE LINE EQUALS THE INVERSE PRICE RATIO (-IPR)

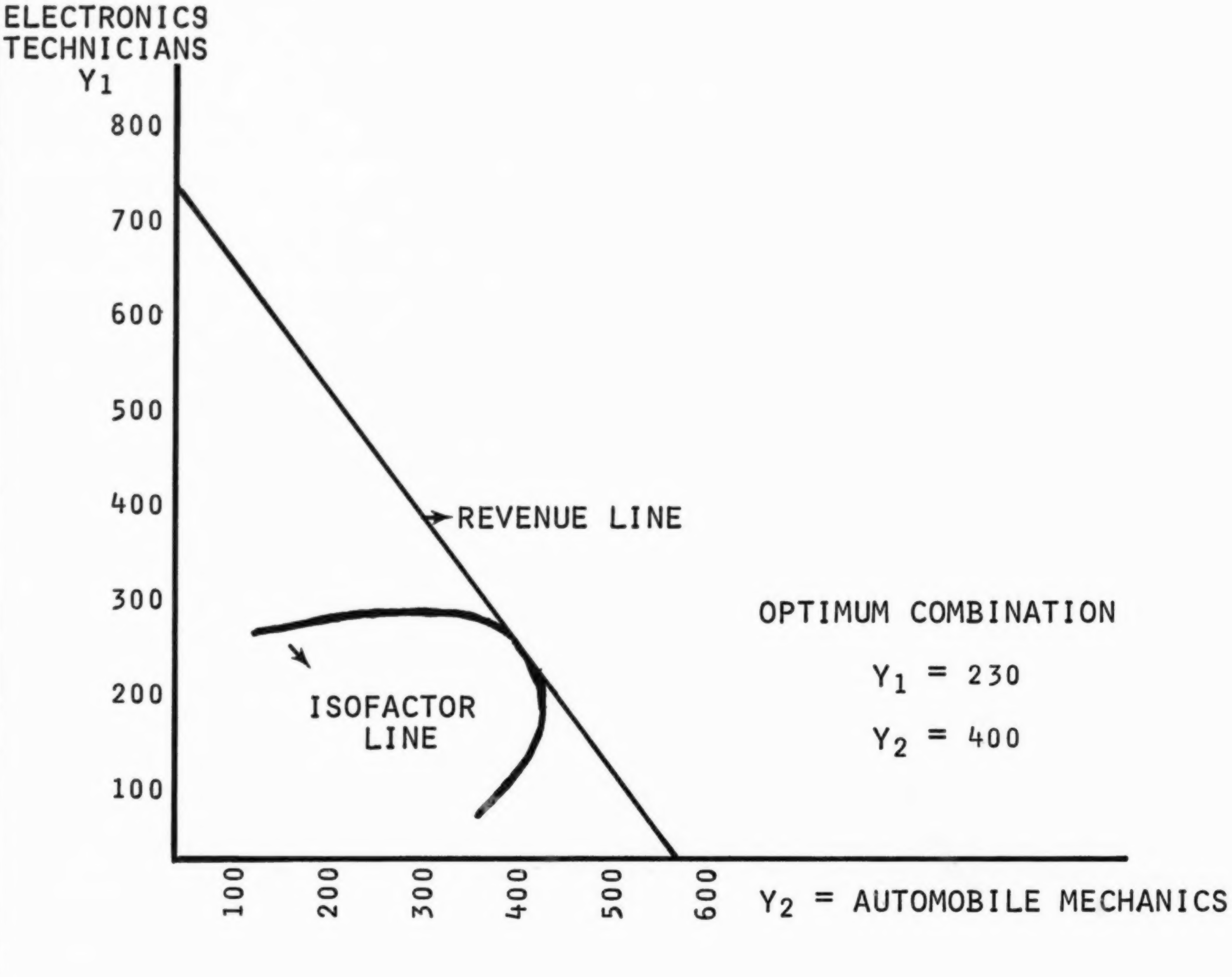
GIVEN: ANNUAL INCOME OF A ELECTRONICS TECHNICIAN $= \$4,000 = Py_1$

ANNUAL INCOME OF AN AUTOMOBILE MECHANIC $= \$5,000 = Py_2$

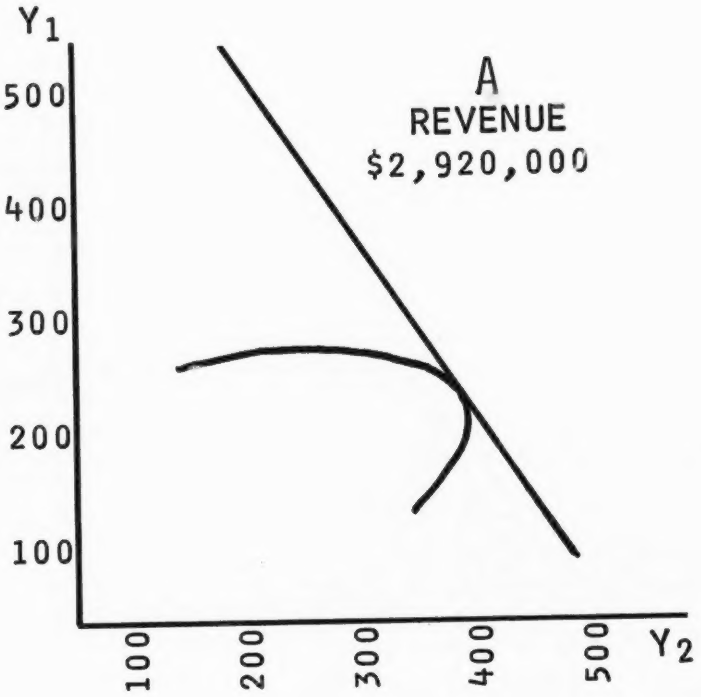
TOTAL REVENUE = \$2,920,000

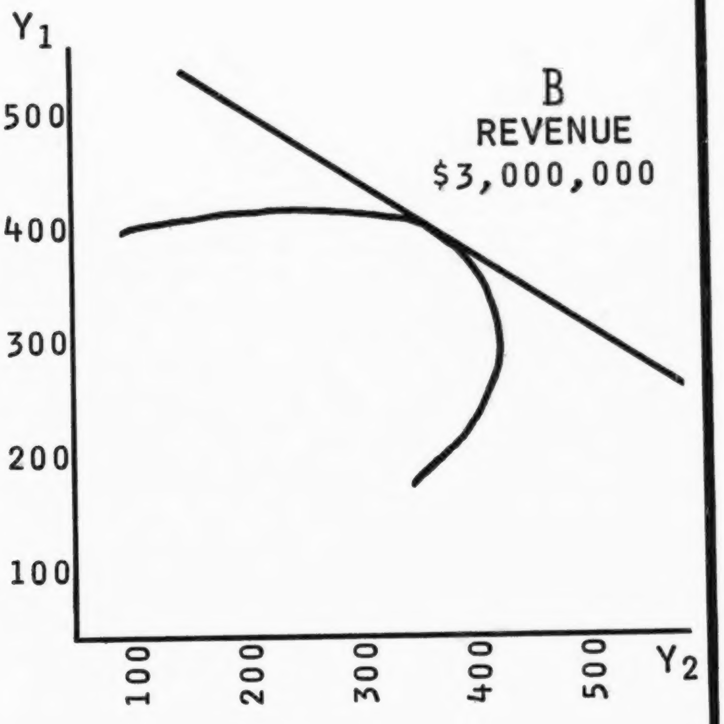
THEREFORE IF $Y_1 = 0$; $Y_2 = 584$

IF $Y_2 = 0$; $Y_1 = 730$



PRICE RELATIONSHIPS





$X_1 = 320$		M R S	A	B
Y_1	Y_2	$\Delta Y_1 / \Delta Y_2$	$-IPR$ $-Py_2/Py_1$	$-IPR$ $-Py_2/Py_1$
125	400	+2.50	$5000/4000$	$4000/6000$
150	410	+2.50		
175	420	-3.00	= 1.25	= 0.66
205	410	-2.50	↓	↓
230	400	-0.80		
250	375	-0.50		
265	345	-0.25		
275	305	-0.00		
275	260	+0.08		
270	200	+0.05		
265	100			

BASIC ASSUMPTIONS OF PRODUCTION ECONOMICS

THE CAUSE-EFFECT RELATIONSHIP BETWEEN INPUTS AND OUTPUTS ARE QUANTITATIVELY KNOWN BY THE DECISION MAKER.

THERE IS A LARGE NUMBER OF METHODS (INPUT COMBINATIONS) WHICH CAN PRODUCE A GIVEN QUANTITY PRODUCT.

THERE IS A LARGE NUMBER OF METHODS (OUTPUT COMBINATIONS) WHICH CAN BE PRODUCED BY A GIVEN SET OF INPUTS.

"OPTIMUM" IS ASSUMED TO BE THE GREATEST POSSIBLE NET BENEFIT OR PROFIT, (TOTAL REVENUE MINUS TOTAL COST).

QUALITY OF INPUTS AND OUTPUTS IS ASSUMED TO BE CONSTANT; A CHANGE IN QUALITY CONSTITUTES A DIFFERENT INPUT OR OUTPUT.

SUMMARY

IMPLICATIONS

THERE IS NO ONE SET OR FIXED COMBINATION OF INPUTS TO PRODUCE A PRODUCT.

VARIOUS COMBINATIONS OF PRODUCTS CAN BE PRODUCED BY A GIVEN SET OF INPUTS.

ONLY VARIABLE COSTS ARE IMPORTANT FOR SHORT-RUN DECISIONS.

OPTIMUM COMBINATIONS OF INPUTS AND OUTPUTS REQUIRE THAT INPUT-OUTPUT RELATIONSHIPS AND RELATIVE PRICES ARE KNOWN.

APPLICATIONS

FACTOR-FACTOR MODEL PROVIDES A FRAMEWORK FOR OPTIMIZING THE COMBINATION OF INPUTS GIVEN A PRODUCT.

PRODUCT-PRODUCT MODEL PROVIDES A FRAMEWORK FOR OPTIMIZING THE COMBINATION OF PRODUCTS GIVEN A SET OF INPUTS.

FACTOR-PRODUCT MODEL PROVIDES A FRAMEWORK TO OPTIMIZE THE QUANTITY OF A VARIABLE INPUT TO BE COMBINED WITH A SET OF FIXED INPUTS.

CRITICAL ASPECTS

ONE MUST HAVE KNOWLEDGE OF THE RELATIONS BETWEEN FACTORS, PRODUCTS AND BETWEEN FACTORS AND PRODUCTS.

OPTIMUM SOLUTIONS REQUIRE KNOWLEDGE OF BOTH PRICES (WAGES, COSTS PER UNIT, ETC.) AND THE PHYSICAL BEHAVIORAL RELATIONSHIPS (CAUSE-EFFECT).

OPTIMUM SOLUTIONS ARE FOUND THROUGH ANALYSIS OF MARGINAL COSTS AND BENEFITS.

SOLUTION OF AN EDUCATION PROBLEM

SITUATION: A VOCATIONAL SCHOOL TRAINING STUDENTS IN TWO OCCUPATIONS, AUTOMOBILE MECHANICS AND ELECTRONICS TECHNICIANS.

PROBLEM: WHAT MIX OF THE TWO OCCUPATIONS SHOULD THE SCHOOL TRAIN STUDENTS TO MAXIMIZE BENEFIT TO SOCIETY?

CONSTRAINTS:

AVAILABLE RESOURCES

TEACHING TIME = 500 UNITS
EQUIPMENT = 4125 UNITS
BUILDING SPACE = 4125 UNITS
STUDENTS = 1000

INPUT-OUTPUT RELATIONSHIPS

ONE AUTOMOBILE MECHANIC REQUIRES 1 UNIT OF TEACHING TIME, 11 UNITS OF EQUIPMENT, 15 UNITS OF BUILDING SPACE, AND 4 STUDENTS.

ONE ELECTRONICS TECHNICIAN GRADUATE REQUIRES 2 UNITS OF TEACHING TIME, 15 UNITS OF EQUIPMENT, 11 UNITS OF BUILDING SPACE, AND 2 STUDENTS.

PRICE RELATIONSHIPS

AUTOMOBILE MECHANIC = \$2.62/HOUR
ELECTRONICS TECHNICIAN = \$4.25/HOUR

LINEAR PROGRAMMING FORMAT

OBJECTIVE FUNCTION: $B = 2.62\ Y_1 + 4.25\ Y_2$

CONSTRAINTS:

$$0 \le Y_1 = 1\ X_1 + 11\ X_2 + 15\ X_3 + 4\ X_4$$

$$0 \le Y_2 = 2\ X_1 + 15\ X_2 + 11\ X_3 + 2\ X_4$$

$$0 \le X_1 \le 500$$

$$0 \le X_2 \le 4025$$

$$0 \le X_3 \le 4025$$

$$0 \le X_4 \le 1000$$

METHOD OF SOLUTION

SOLVE FOR END POINTS:

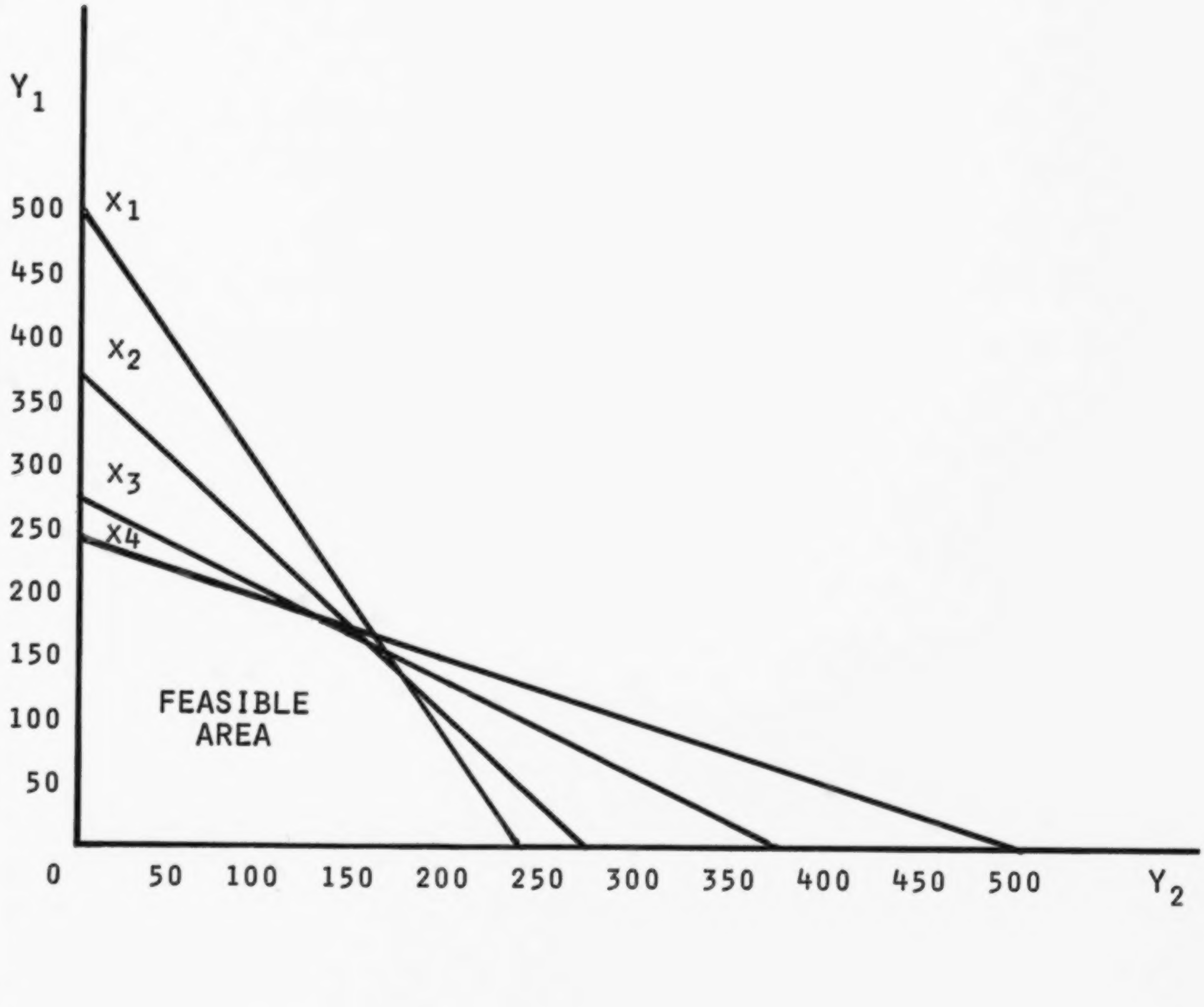
$500\ X_1 = 500\ Y_1$ OR $250\ Y_2$

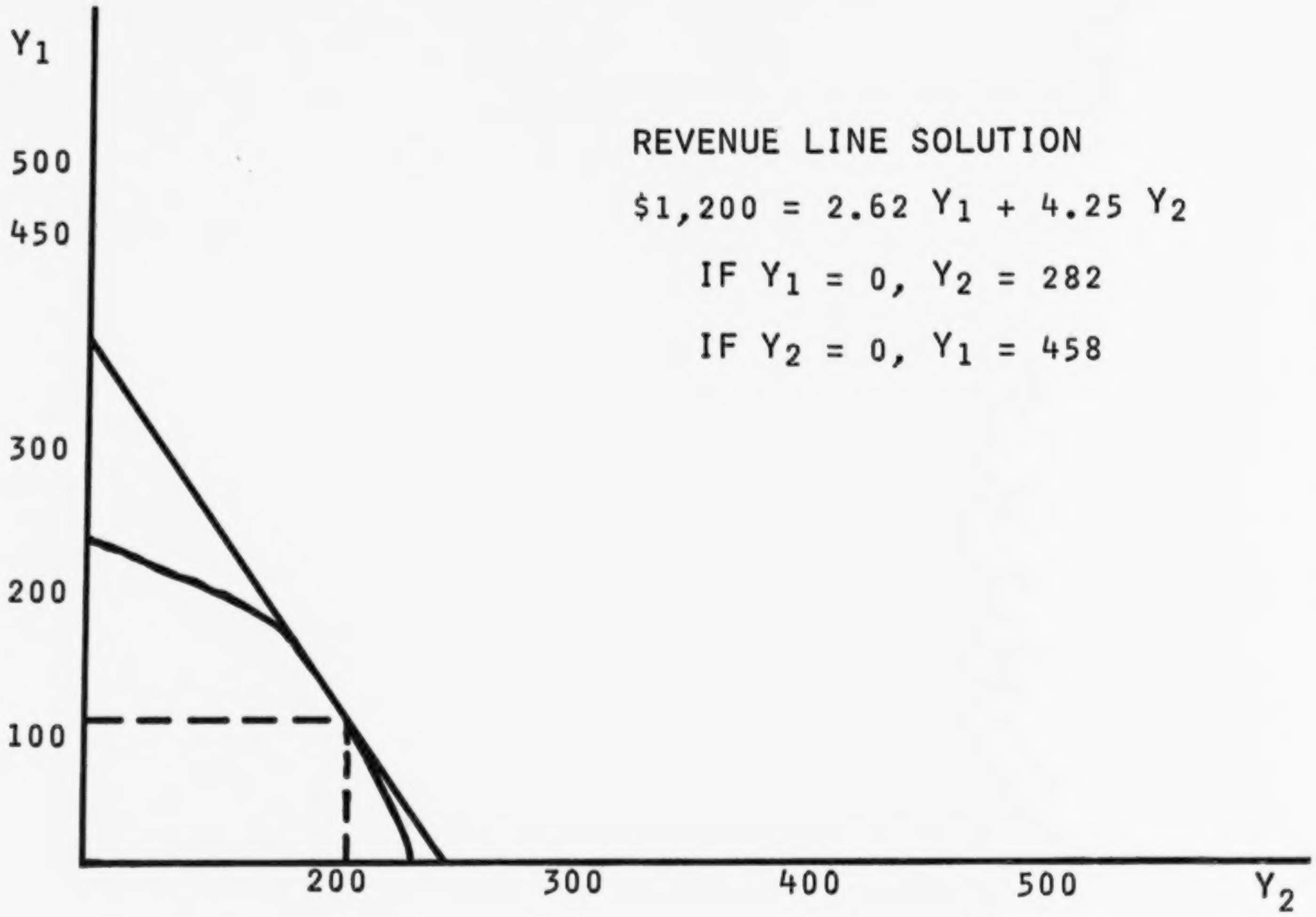
$4125\ X_2 = 375\ Y_1$ OR $275\ Y_2$

$4125\ X_3 = 275\ Y_1$ OR $375\ Y_2$

$1000\ X_4 = 250\ Y_1$ OR $500\ Y_2$

GRAPHIC PORTRAYAL OF LINEAR PROGRAMMING ANALYSIS





REVENUE LINE SOLUTION

$\$1,200 = 2.62\ Y_1 + 4.25\ Y_2$

IF $Y_1 = 0$, $Y_2 = 282$

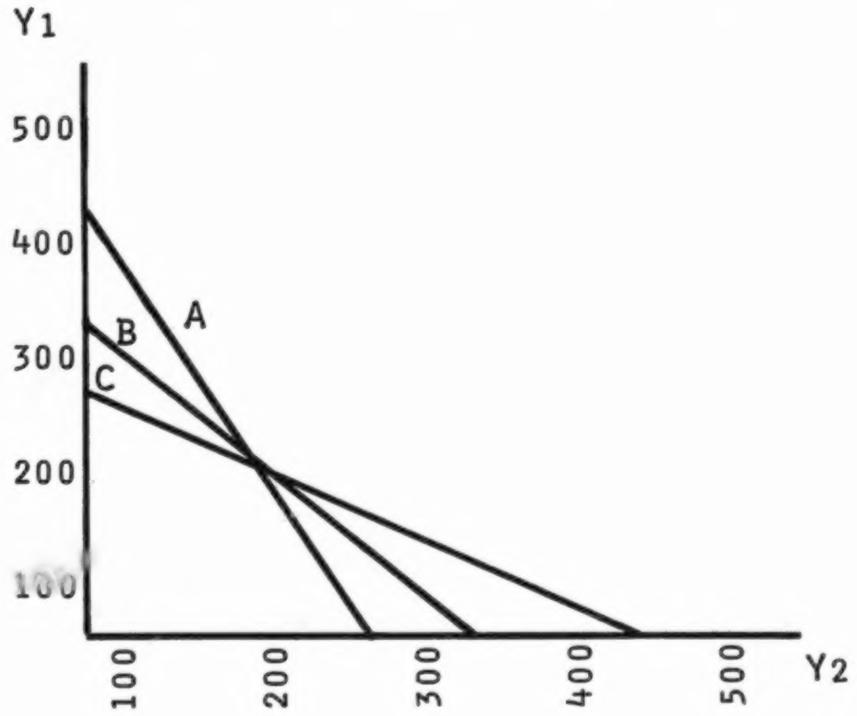
IF $Y_2 = 0$, $Y_1 = 458$

FINAL SOLUTION

$P_{y1} = \$2.62$ $P_{y2} = \$4.25$

$$\begin{array}{rcccccccc} 100\ Y_1 & = & 100\ X_1 & + & 1,100\ X_2 & + & 1,500\ X_3 & + & 400\ X_4 \\ 200\ Y_2 & = & 400\ X_2 & + & 3,000\ X_2 & + & 2,200\ X_3 & + & 400\ X_4 \\ \hline & & 500\ X_1 & & 4,100\ X_2 & & 3,700\ X_3 & & 800\ X_4 \end{array}$$

PRICE RELATIONSHIPS



A $P_{y1} = \$2.62$ $Y_1 = 100$ $\text{REVENUE} = \$1{,}112.00$

$P_{y2} = \$4.25$ $Y_2 = 200$

B $P_{y1} = \$3.25$ $Y_1 = 155$ $\text{REVENUE} = \$1{,}004.25$

$P_{y2} = \$3.25$ $Y_2 = 154$

C $P_{y1} = \$4.25$ $Y_1 = 200$ $\text{REVENUE} = \$\ 112.00$

$P_{y2} = \$2.62$ $Y_2 = 100$

WHEN CAN LINEAR PROGRAMMING BE USED?

NECESSARY CONDITIONS

A LINEAR OBJECTIVE FUNCTION TO BE OPTIMIZED, MAXIMUM OR MINIMUM.

RESTRICTIONS ON THE EXTENT OF ATTAINMENT OF OBJECTIVES EXPRESSED AS LINEAR INEQUALITIES.

NECESSARY DATA

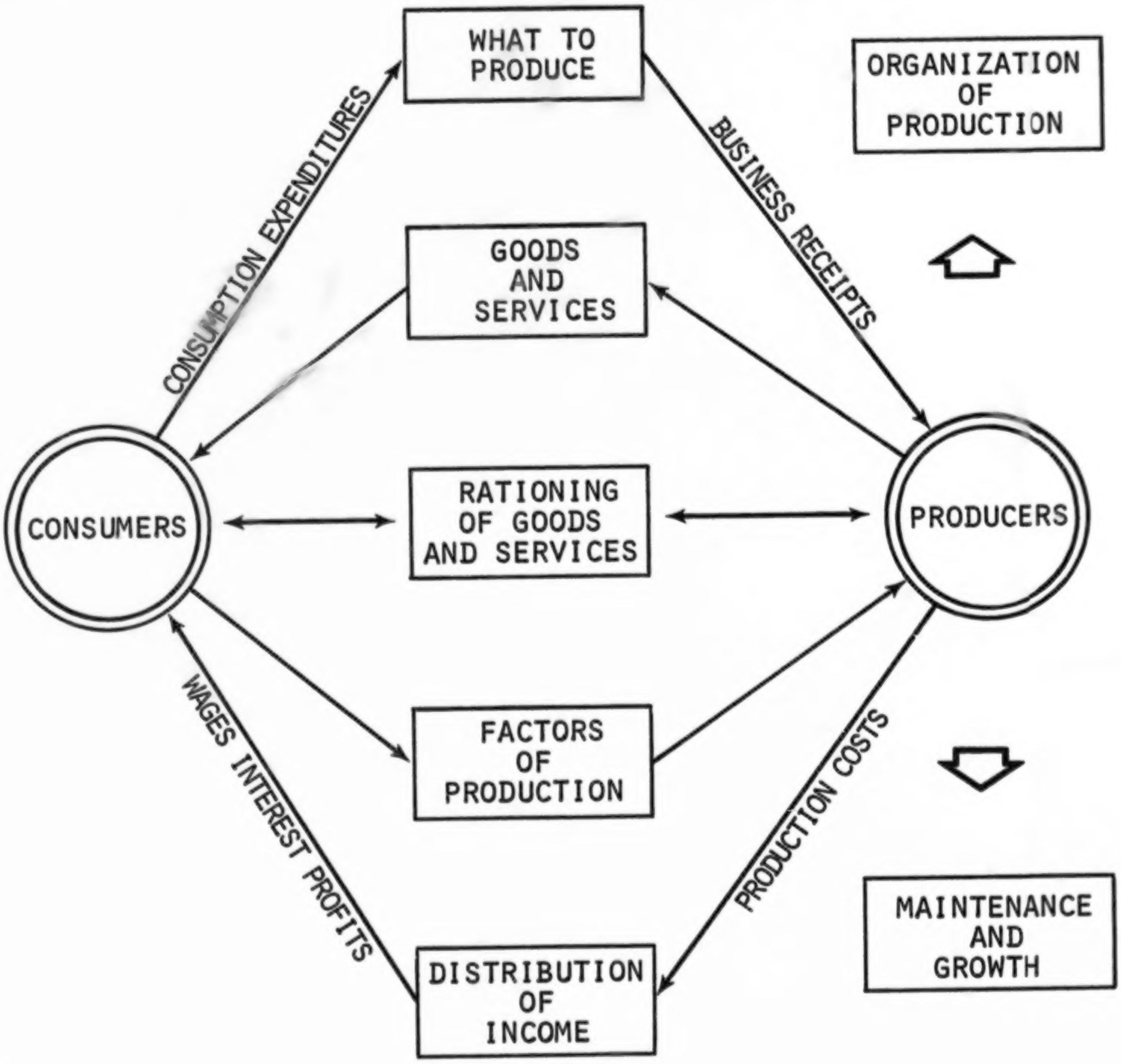
PROFIT PER OUTPUT UNIT

INPUT-OUTPUT RELATIONSHIPS

TOTAL AVAILABLE RESOURCES OR BUDGET

UPPER AND LOWER LIMITS ON THE QUANTITY OF EACH PRODUCT TO BE PRODUCED

ECONOMIC SYSTEM


WHAT TO PRODUCE
ORGANIZATION OF PRODUCTION
CONSUMPTION EXPENDITURES
BUSINESS RECEIPTS
GOODS AND SERVICES
CONSUMERS
RATIONING OF GOODS AND SERVICES
PRODUCERS
WAGES INTEREST PROFITS
FACTORS OF PRODUCTION
PRODUCTION COSTS
MAINTENANCE AND GROWTH
DISTRIBUTION OF INCOME

REAL FLOW: COUNTERCLOCKWISE
MONETARY FLOW: CLOCKWISE

ECONOMIC VALUE: IMPORTANCE FOR EDUCATION

DEMAND AND/OR SUPPLY REFERS TO PRICE AND QUANTITY, NEVER TO PRICE OR QUANTITY.

MARKET PRICES ARE DETERMINED THROUGH THE INTERACTION OF SUPPLY AND DEMAND.

THE ASSUMPTION OF CONSTANT PRICES OR CONSTANT RELATIVE PRICES CAN ONLY BE MADE IF: 1) FIRM (SCHOOL) IS A PRICE TAKER, I.E., CANNOT AFFECT THE PRICE (SALARY) OF ITS OWN PRODUCT BY VARYING THE QUANTITY OF PRODUCT, AND 2) ALL OTHER ASPECTS OF THE ENVIRONMENT ARE CONSTANT.

THE DEMAND FOR VOCATIONAL EDUCATION IS PRIMARILY AN INTERMEDIATE DEMAND DERIVED FROM ITS EFFECT UPON SALARIES AND EMPLOYMENT OF ITS GRADUATES WHICH IS DERIVED FROM THEIR CONTRIBUTION TO THE PRODUCTION OF FINAL GOODS AND SERVICES.

THE BASIC FUNCTION OF PRICES IS THE COMMUNICATION OF ECONOMIC VALUE TO CONSUMERS AND PRODUCERS.

ECONOMIC DETERMINATION OF VALUE

ECONOMIC VALUE = THE MARKET PRICE OF A GOOD OR SERVICE

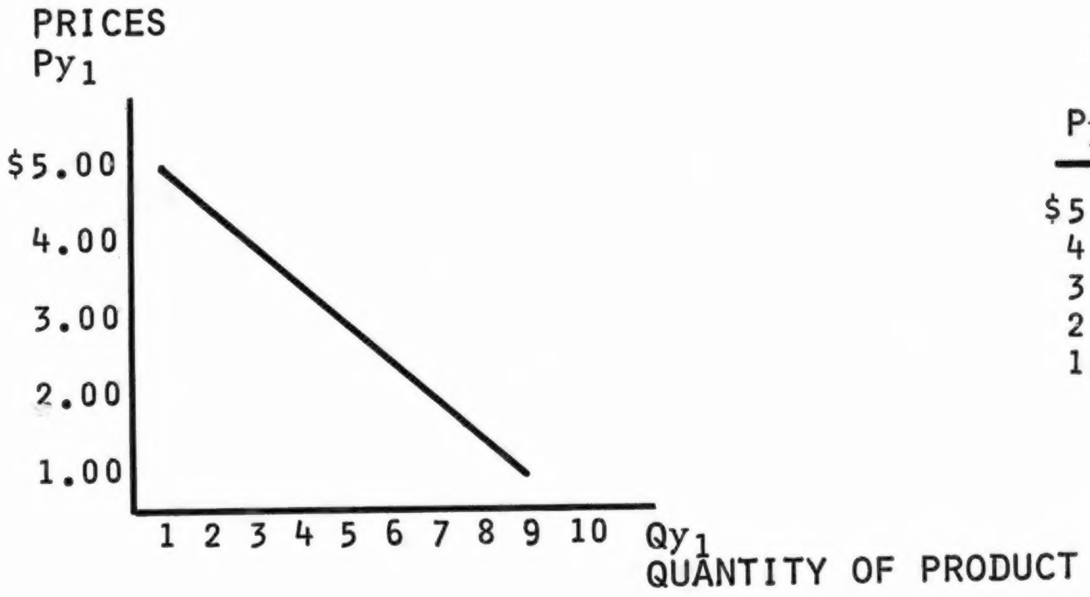
MARKET PRICES ARE DETERMINED THROUGH THE INTERACTION OF SUPPLY AND DEMAND

DEMAND

DEFINITION OF DEMAND:	THE QUANTITY OF A GOOD OR SERVICE THAT PEOPLE ARE WILLING AND ABLE TO BUY AT EACH POSSIBLE PRICE DURING A SPECIFIC PERIOD OF TIME.
DETERMINANT OF DEMAND:	MARGINAL UTILITY, THE ADDITIONAL VALUE OR DESIRABILITY WHICH A PERSON PLACES ON A GOOD OR SERVICE RELATIVE TO ALL OTHER GOODS AND SERVICES.

FINAL DEMAND

(DEMAND FOR FINAL CONSUMPTION)

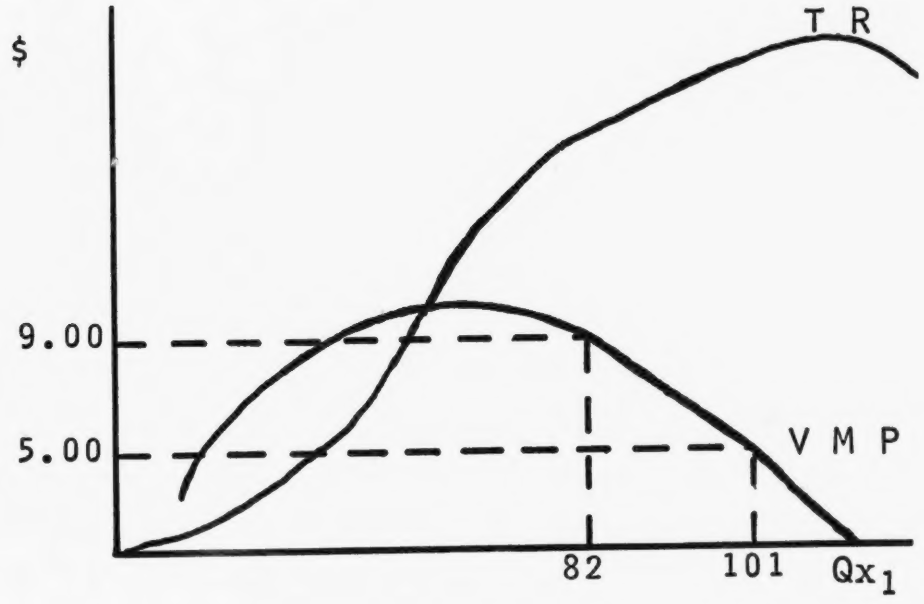


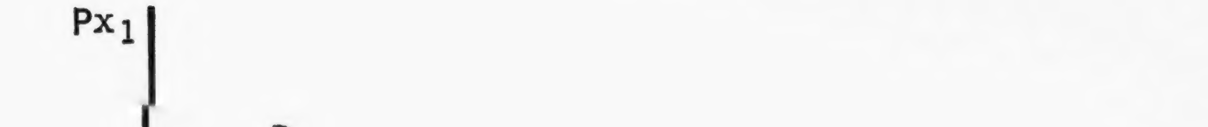
Py_1	Qy_1
$5.00	1
4.00	3
3.00	5
2.00	7
1.00	9

LAW OF DEMAND: THERE IS AN INVERSE RELATIONSHIP BETWEEN THE PRICE OF A GOOD AND THE QUANTITY DEMANDED.

INTERMEDIATE DEMAND

(DEMAND FOR A FACTOR OF PRODUCTION)





THE DEMAND FOR EDUCATION

FINAL DEMAND: DEMAND FOR FINAL CONSUMPTION, I.E. EDUCATION FOR THE PERSONAL SATISFACTION OF KNOWLEDGE.

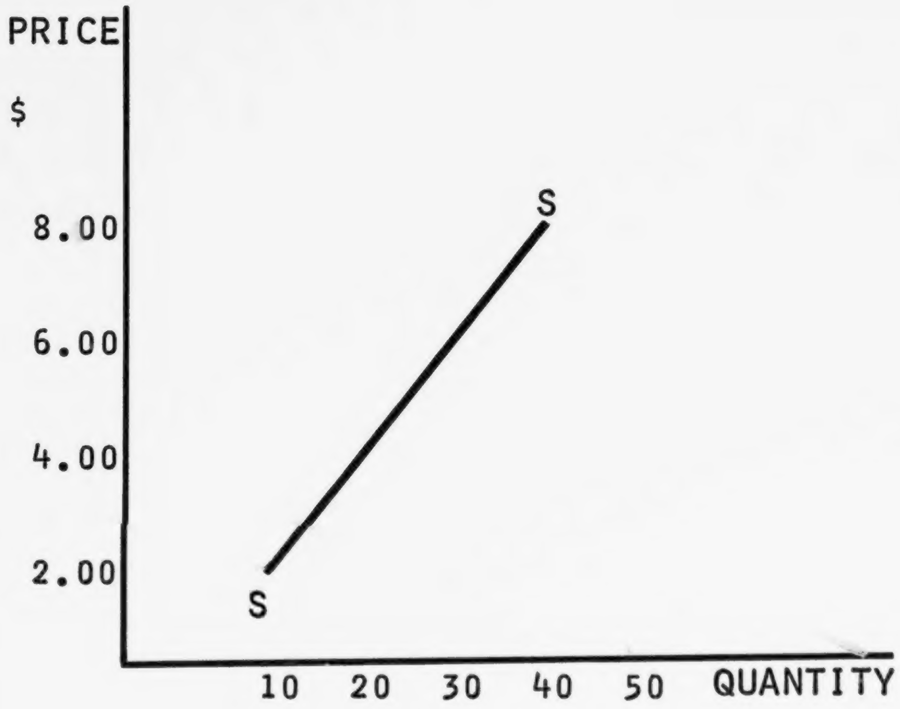
INTERMEDIATE DEMAND: DERIVED FROM ITS VALUE OR PRODUCTIVITY IN PRODUCING OTHER GOODS AND SERVICES.

EXAMPLE: DEMAND FOR PLEASURE CAUSES A DEMAND FOR TELEVISION, A DEMAND FOR ELECTRONICS TECHNICIANS, A DEMAND FOR ELECTRONICS EDUCATION AND A DEMAND FOR ELECTRONICS TEACHERS

THE DEMAND FOR EDUCATION CONSISTS OF BOTH FINAL AND INTERMEDIATE DEMANDS.

SUPPLY

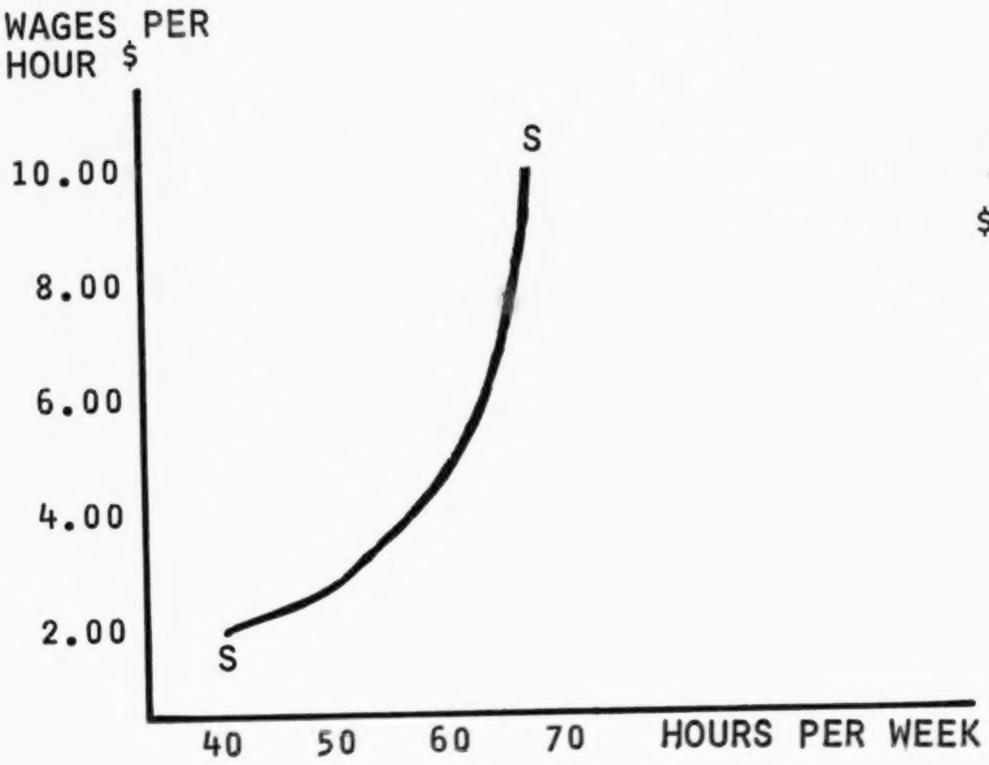
DEFINITION: THE QUANTITY OF A GOOD OR SERVICE AVAILABLE AND OFFERED FOR SALE AT EACH POSSIBLE PRICE DURING A PERIOD OF TIME.



PRICE	QUANTITY
$2.00	10
3.00	15
4.00	20
5.00	25
6.00	30
7.00	35
8.00	40

LAW OF SUPPLY: THERE IS A DIRECT RELATIONSHIP BETWEEN THE PRICE OF A COMMODITY AND THE QUANTITY OF THAT COMMODITY OFFERED FOR SALE.

SUPPLY OF LABOR

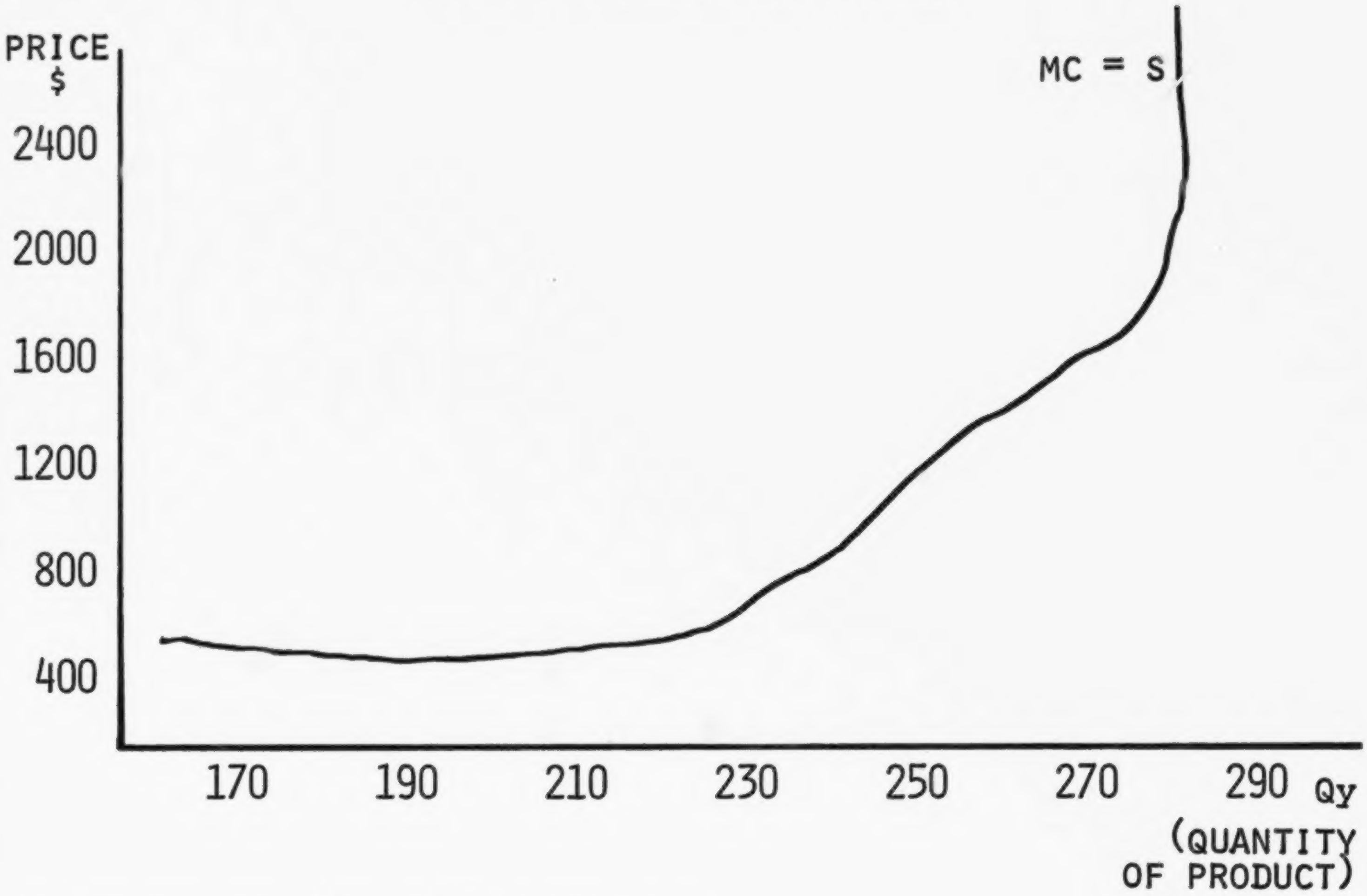


WAGES	HOURS
$ 2.00	40.0
3.00	50.0
4.00	55.0
5.00	60.0
6.00	62.5
7.00	64.0
8.00	65.0
9.00	65.75
10.00	66.25

DETERMINANTS OF LABOR SUPPLY

- THE UTILITY OF INCOME
- THE UTILITY OF LEISURE
- OPPORTUNITY COSTS-INCOME WHICH COULD BE EARNED IN ALTERNATIVE OCCUPATIONS

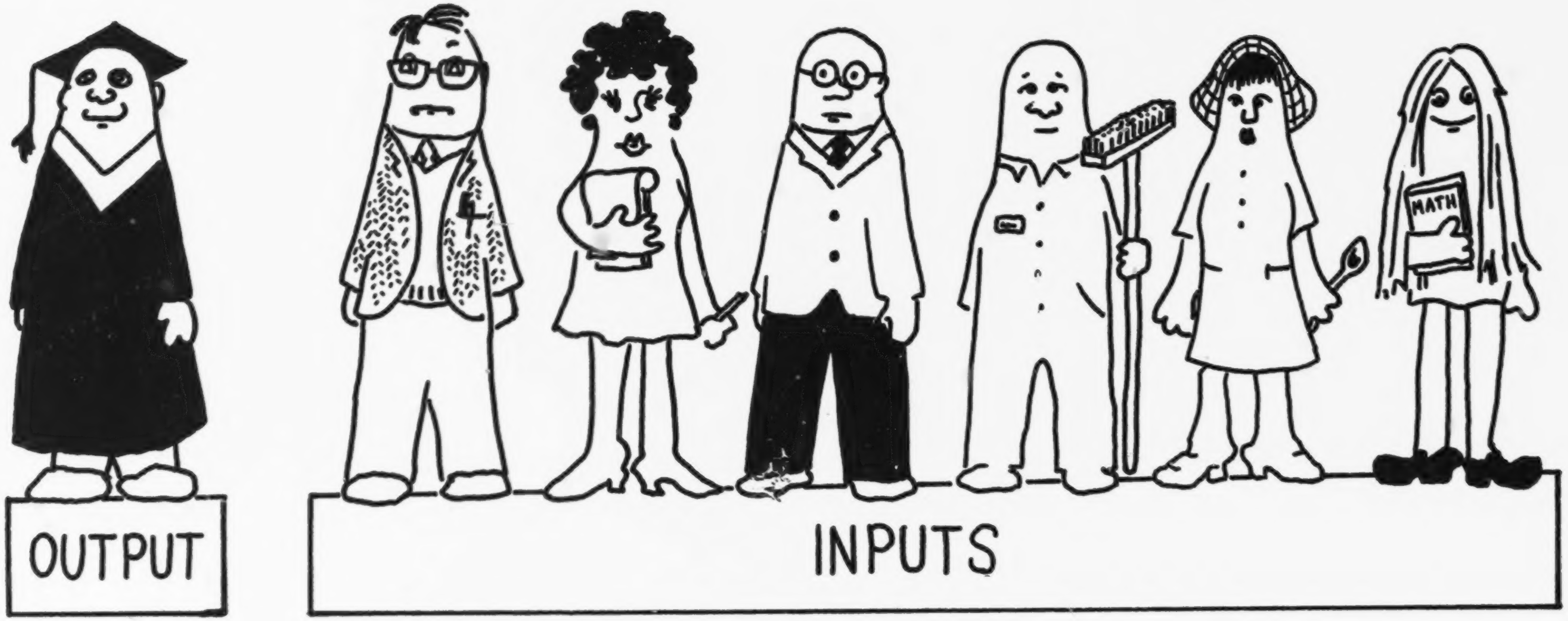
SUPPLY SCHEDULE OF A FIRM



X_1	TVC ($1000)	Y_1	TR ($1000)	MC $\Delta TVC / \Delta Y_1$
18	7.2	150	600.0	
				352.0
40	16.0	175	700.0	
				333.0
65	26.0	205	820.0	
				400.0
90	36.0	230	920.0	
				800.0
130	52.0	250	1000.0	
				1333.0
180	72.0	265	1060.0	
				2400.0
240	96.0	275	1100.0	
				∞
280	112.0	275	1100.0	
300	120.0	270	1080.0	
330	128.0	265	1060.0	

Py	Qs
$800	240
1200	250
1600	265
2000	265
2400	275
3000	275

Relationship of Supply to Education


MATH
OUTPUT
INPUTS

RELATIONSHIP OF SUPPLY TO EDUCATION

SUPPLY OF LABOR

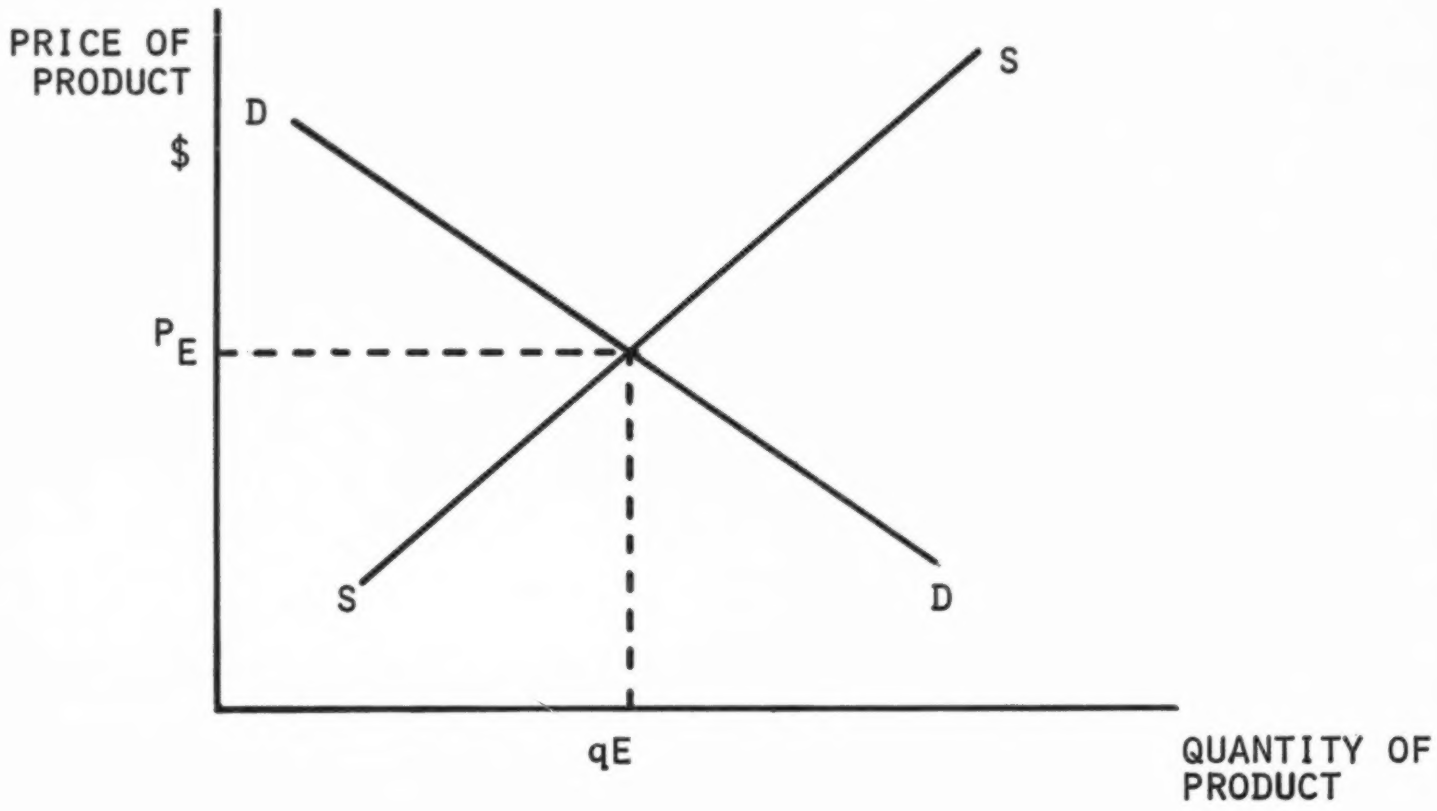
(INPUTS INTO THE EDUCATIONAL PROCESS)

- STUDENTS
- TEACHERS
- ADMINISTRATION
- SERVICE PERSONNEL

(OUTPUTS FROM THE EDUCATIONAL PROCESS)

- GRADUATES
  - ACADEMIC
  - VOCATIONAL
  - GENERAL
- NONGRADUATES

MARKET OR EQUILIBRIUM PRICE



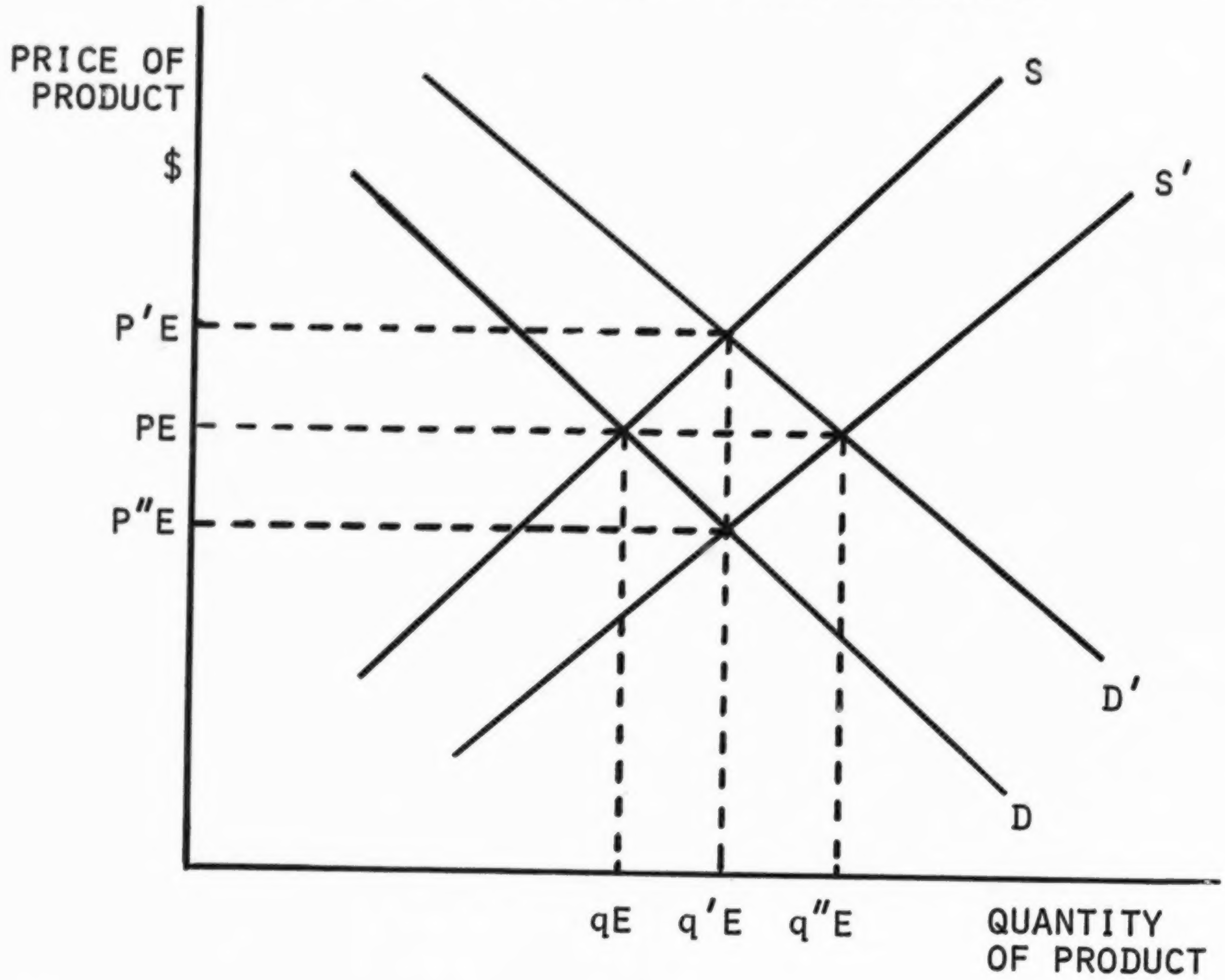
MARKET PRICE, I.E. WAGE RATE, IS UNIQUELY DETERMINED BY THE INTERACTION OF SUPPLY OF AND DEMAND FOR A GOOD OR SERVICE.

FUNCTIONS OF PRICE:

COMMUNICATION BETWEEN PRODUCERS AND CONSUMERS

RATIONING AND RESOURCE ALLOCATION

SHIFTS IN SUPPLY AND DEMAND SCHEDULES



DETERMINANTS OF A SHIFT IN DEMAND

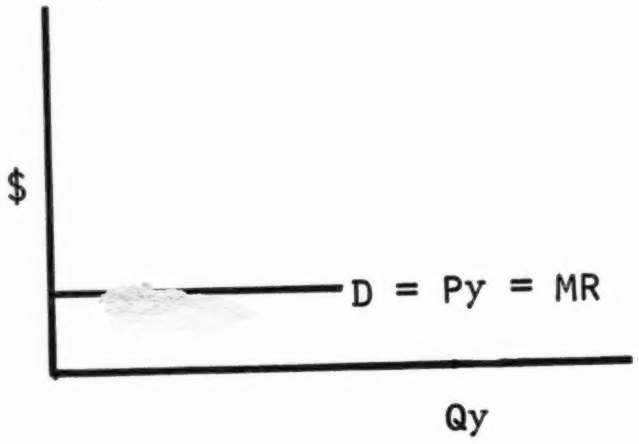
- INCOME PER CAPITA
- CONSUMER PREFERENCES
- TOTAL POPULATION
- PRICE CHANGES OF SUBSTITUTE OR COMPLEMENTARY GOODS
- EXPECTATIONS

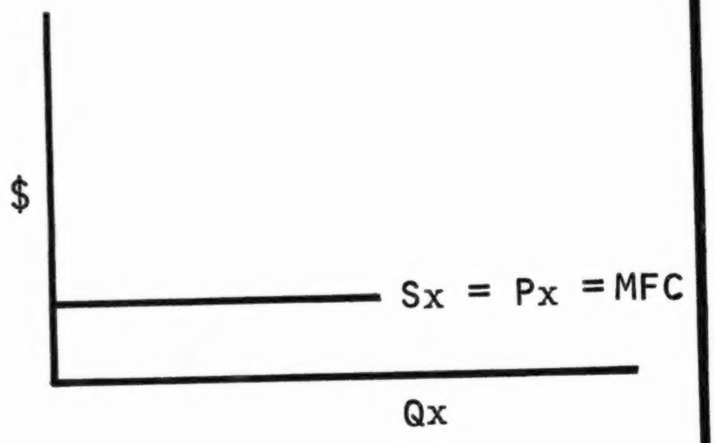
DETERMINANTS OF A SHIFT IN SUPPLY

- PRICE CHANGES OF INPUTS
- CHANGES IN TECHNOLOGY
- CHANGES IN PRICES OF OTHER PRODUCTS
- CHANGES IN PRODUCER′S EXPECTATIONS
- CHANGES IN NUMBER OF FIRMS IN THE INDUSTRY

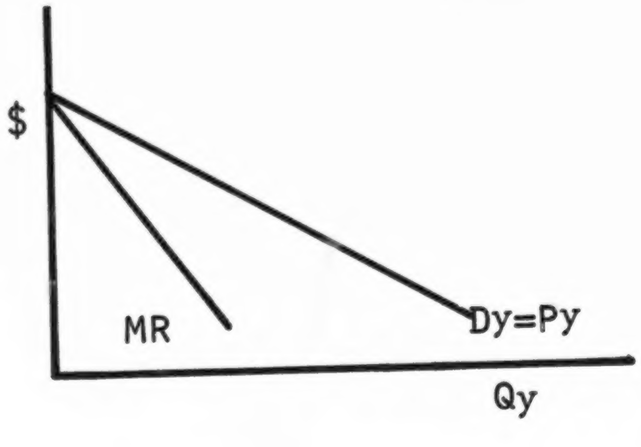
PRICE TAKER OR PRICE MAKER?

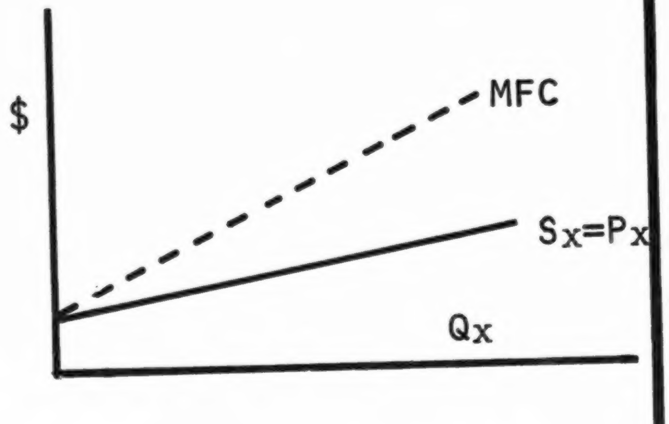
PRICE TAKER: FIRM'S PERCENTAGE OF TOTAL MARKET IS SO SMALL THAT ITS ACTIONS DO NOT AFFECT MARKET PRICE; CAN ASSUME $MR = Py = Dy$ AND $MFC = Px = Sx$





PRICE MAKER: THE ACTIONS OF THE FIRM DIRECTLY AFFECT MARKET PRICE SO THAT $Dy = Py$, $MR = \frac{\Delta TR}{\Delta Y}$ AND $Sx = Px$, $MFC = \frac{\Delta TC}{\Delta X}$





LIMITATIONS OF PRICES IN REFLECTING VALUE

INSTITUTIONAL INFLUENCES:

- MINIMUM WAGE LAWS
- LABOR UNIONS
- ADJUSTMENT LAGS
- GOVERNMENT TAXES & SUBSIDIES
- IMPERFECT COMPETITION
- DECREASING COST INDUSTRIES

SOCIAL ASPECTS:

- EXTERNALITIES
- DISTRIBUTION OF INCOME
- CONSUMER SOVEREIGNTY

PRICE LEVELS:

- INFLATION
- DEFLATION
- REAL OR MONEY VALUE

SECTION 12

STATISTICAL ANALYSIS IN PPBS

A. *Objective.* The objective of this section is to provide the learner with background information in the skills and concepts related to statistical analysis in PPBS.

B. *Desired Outcomes.* If the general objective of this section has been achieved, the learner should be able to:

1. Differentiate between mean, mode, median, and variance.
2. Define descriptive statistics.
3. Identify probability.
4. Differentiate between descriptive and inferential statistics.
5. Identify linear models.
6. Prepare criteria for determining an optimum statistical model.
7. Identify the role of statistical analysis in planning, programming, and budgeting.

C. *Prerequisite.* Knowledge of the concepts presented in Sections 1, 4, and 10 should precede the introduction to this section.

D. *Placement of Section in Sequence.* This section may be used independently. Learners should have elementary statistical knowledge before beginning this section.

E. *Pre-evaluation.* The learner may be asked to demonstrate successful achievement of the specific objectives in Sections 1, 4, and 10.

F. *Minimum Time Estimate.* Approximately three to six hours should be devoted to learning activity designed to reach a satisfactory level of performance for this section.

G. *Suggested Instructional Outline.*

Major Topics	Instructional Aids (page)
1. Statistics	
a. Definition	257
b. Descriptive	258
c. Inferential	259
2. Role of Statistics in PPBS	260, 261

    a. Planning 262
    b. Programming 263
    c. Budgeting 264
3. Assumptions of Statistics 265
4. Optimum Model 266
5. Dangers of Statistical Analysis 267-268

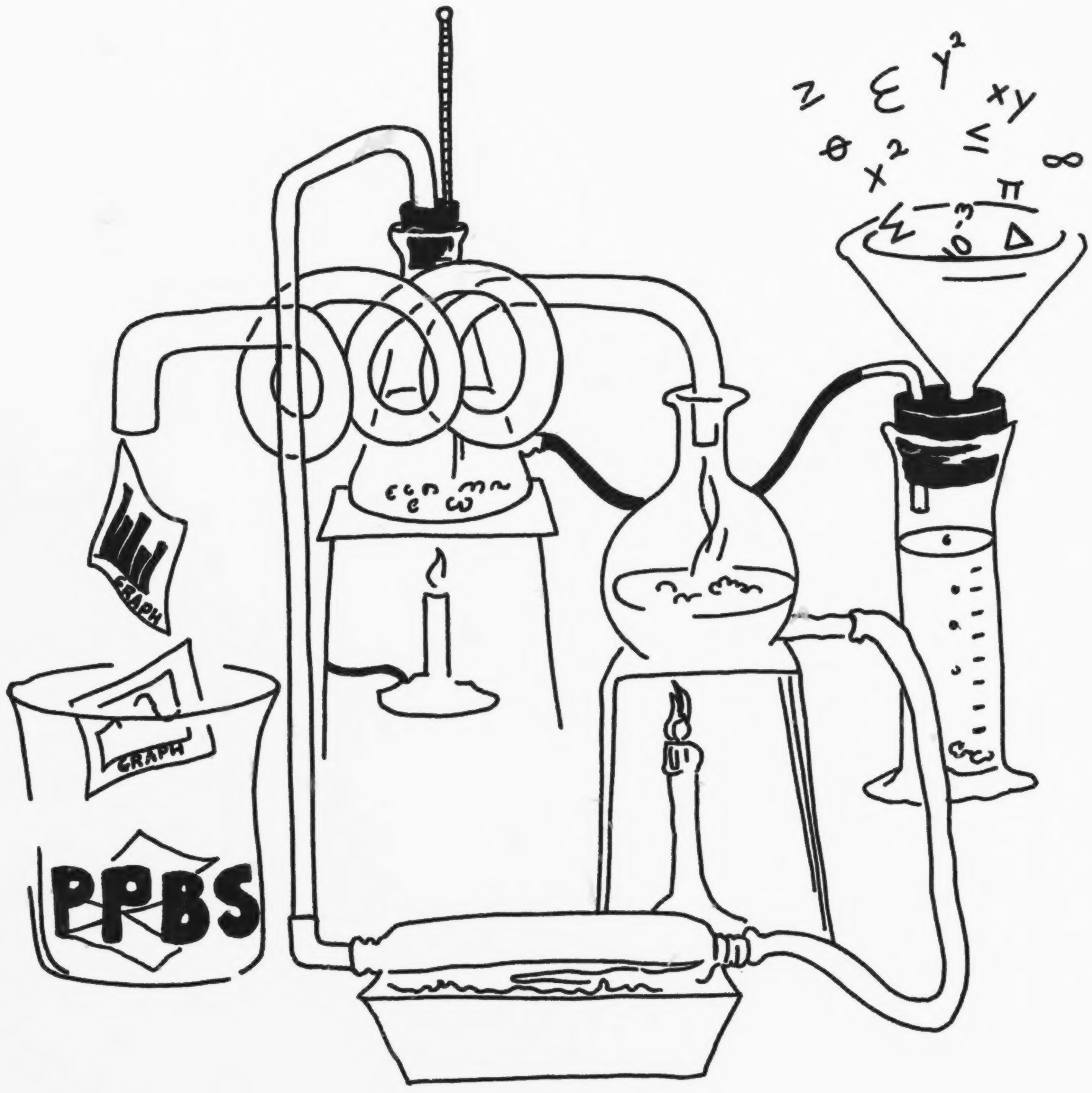
H. *Suggested Instructional Activities.*

1. Lectures may be used to clarify the general objective of this section.
2. Individuals may be asked to work on statistical problems.
3. Hypothetical statistical data could be presented to the group. The group would be asked to compute certain descriptive statistics.

I. *Reference Material.*

1. Joseph H. McGivney and William C. Nelson, *Planning, Programming, Budgeting Systems for Educators. Volume III: An Annotated Bibliography* (Columbus: The Center for Vocational and Technical Education, 1969).
2. Paul Blommers and E. F. Lindquist, *Elementary Statistical Methods in Psychology and Education* (Boston: Houghton-Mifflin, 1960).
3. William L. Hays, *Statistics for Psychologists* (New York: Holt, Rinehart and Winston, 1963).
4. Donald L. Meyer, *Educational Statistics* (New York: Center for Applied Research in Education, 1967).

J. *Instructional Aids*--pages 257 through 268.


GRAPH
GRAPH
PPBS

Role of Statistics in PPBS

STATISTICS IN PPBS

STATISTICS VERSUS MATHEMATICS

MATHEMATICS: QUANTITATIVE RELATIONSHIPS WHICH ASSUME NO ERROR.

EXAMPLE: $Y = 5X$

STATISTICS: QUANTITATIVE RELATIONSHIPS WHICH ALLOW FOR ERROR.

EXAMPLE: $Y = 5X + E$

SOURCES OF ERROR:

1 SAMPLING ERROR DERIVED FROM THE FACT THAT THE SAMPLE DATA MAY NOT ACCURATELY REFLECT THE POPULATION.

2 MEASUREMENT ERROR DERIVED FROM INACCURATE ASSESSMENT OR REPORTING OF DATA.

3 FUNCTIONAL ERROR DERIVED FROM LACK OF KNOWLEDGE CONCERNING THE TRUE RELATIONSHIPS BETWEEN VARIABLES.

USES AND TYPES OF STATISTICAL ANALYSIS

DESCRIPTIVE STATISTICS: THE COLLECTION AND TABULATION OF DATA DESCRIBING A POPULATION

MEAN:	AVERAGE VALUE OF ALL OBSERVATIONS IN A SET
MEDIAN:	THE MIDDLE VALUE IN A SET
MODE:	THE VALUE WHICH APPEARS MOST OFTEN IN A SET
RANGE:	THE RANGE OF VALUES IN A SET
VARIANCE:	A MEASURE OF THE VARIATION OF ALL OBSERVATIONS WITHIN A SET

EXAMPLE

Y
3
4
2
5
1
3
4
4
26

MEAN: 26/8 = 3.25

MEDIAN: 3

MODE: 4

RANGE: 1 → 5

VARIANCE: $\Sigma(Y-\overline{Y})^2 / N-1 = \sigma^2$

$11.5/7 = 1.64$

INFERENTIAL STATISTICS

DEFINITION: DRAWING CONCLUSIONS ABOUT A POPULATION FROM A GIVEN SAMPLE OF THAT POPULATION.

PROBABILITY REFERS TO THE LONG RUN RELATIVE FREQUENCY OF AN EVENT OCCURRING OR A SUBJECTIVE EVALUATION OF AN EVENT OCCURRING.

EXAMPLE: IN A GRADUATING CLASS OF 50 PEOPLE, 10 OBTAIN JOBS PAYING \$8,000 ANNUALLY, 20 AT \$4,000, AND 10 ARE UNEMPLOYED. PROBABILITY OF ANY ONE PERSON RECEIVING \$8,000 IS .2 OR 20%. THE EXPECTED VALUE OF ALL GRADUATES IS \$5,600.

$$.2\ (8{,}000) + .4\ (6{,}000) + .4\ (4{,}000) + .2\ (0) = \$5{,}600$$

BAYESIAN STATISTICS REFERS TO A METHOD OF REVISING PRIOR PROBABILITIES BY THE ADDITION OF NEW INFORMATION TO YIELD POSTERIOR PROBABILITIES.

$$\text{POSTERIOR PROBABILITY} = \frac{\text{(MARGINAL PROBABILITY)(JOINT PROBABILITY)}}{\text{SUM OF MARGINAL PROBABILITIES}}$$

EXAMPLE: GIVEN 80% OF PERSONS RECEIVING \$8,000 SALARY HAVE GREATER THAN 120 I.Q.

PROBABILITY	SALARY
20%	\$8000
40%	6000
40%	4000
20%	0000
100%	

GIVEN A PERSON WITH \$8000 SALARY, WHAT IS THE PROBABILITY THAT HIS I.Q. IS GREATER THAN 120?

$$P\ (120\ \$8000) = \frac{.8\ (.2)\ (.8)}{.8\ (.2)\ (.8) + .2\ (.2)\ (.2)} = \frac{.128}{.136} = .94$$

LINEAR MODELS

REFERS TO A MODEL WHERE A DEPENDENT VARIABLE IS FUNCTION OF OR EXPLAINED BY ONE OR MORE INDEPENDENT VARIABLES

EXAMPLE: $Y = .8 X_1 + 25 X_2 + E$

WHERE
Y = NUMBER OF GRADUATES
X_1 = NUMBER OF STUDENTS
X_2 = NUMBER OF TEACHERS
E = ERROR TERM

THE LINEAR MODEL FORMS THE BASIS FOR:

PROJECTION ESTIMATES

LINEAR PROGRAMMING MODELS

INPUT-OUTPUT MODELS

MANPOWER ESTIMATES

SIMULATION MODELS

MANAGEMENT GAMES

ANALYSIS OF VARIANCE

ROLE OF STATISTICAL ANALYSIS IN PPBS

PLANNING: INFERENTIAL STATISTICS ARE VERY IMPORTANT WHILE DESCRIPTIVE STATISTICS ARE OF LIMITED VALUE.

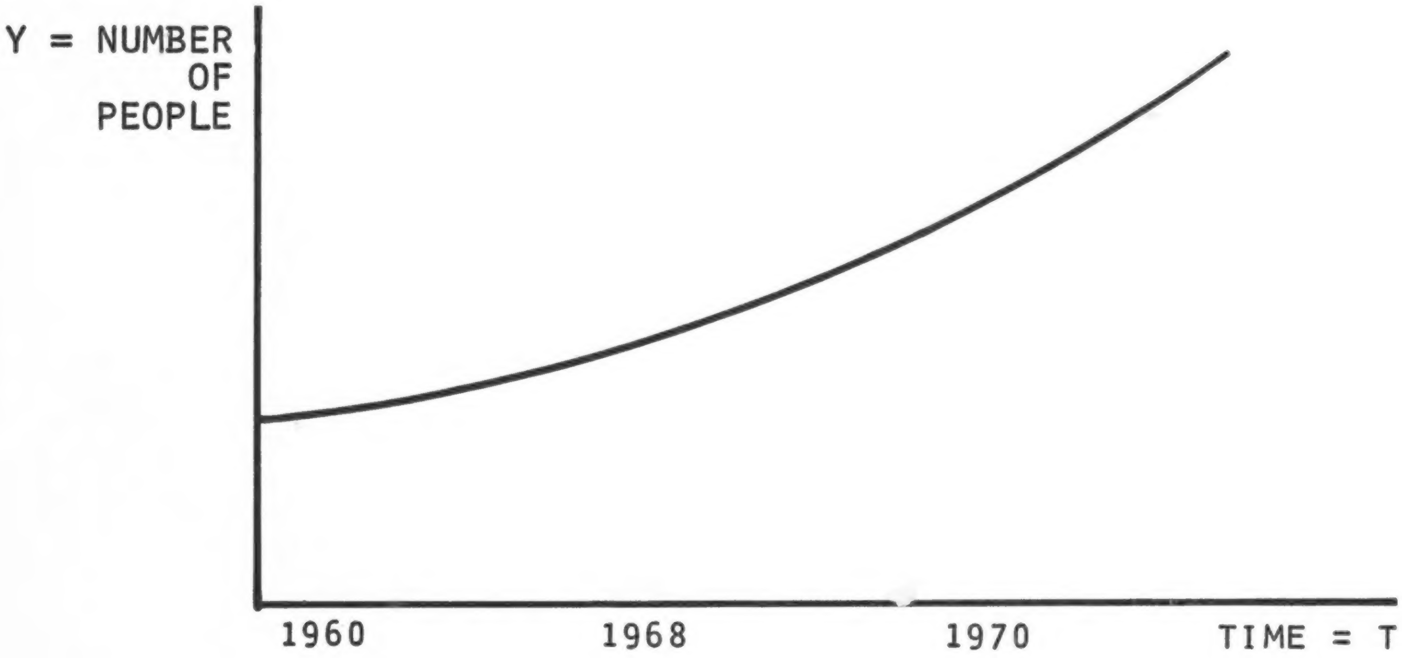
TO DERIVE POPULATION AND OCCUPATION PROJECTIONS

TO FORMULATE MACROMODELS OF SOCIETY INCLUDING ECONOMIC SECTORS, MANPOWER REQUIREMENTS AND EDUCATIONAL SYSTEMS

TO DESCRIBE ALTERNATIVE EDUCATIONAL SYSTEMS

EXAMPLE

PROJECTION OF NEED FOR COMPUTER PROGRAMMERS



$$Y = .05(T^2) - .10\ (T)$$

PROGRAMMING: BOTH INFERENTIAL AND DESCRIPTIVE STATISTICS ARE IMPORTANT.

TO ESTIMATE FIVE-YEAR PROJECTIONS OF EDUCATIONAL PROGRAMS, OUTPUTS AND COSTS.

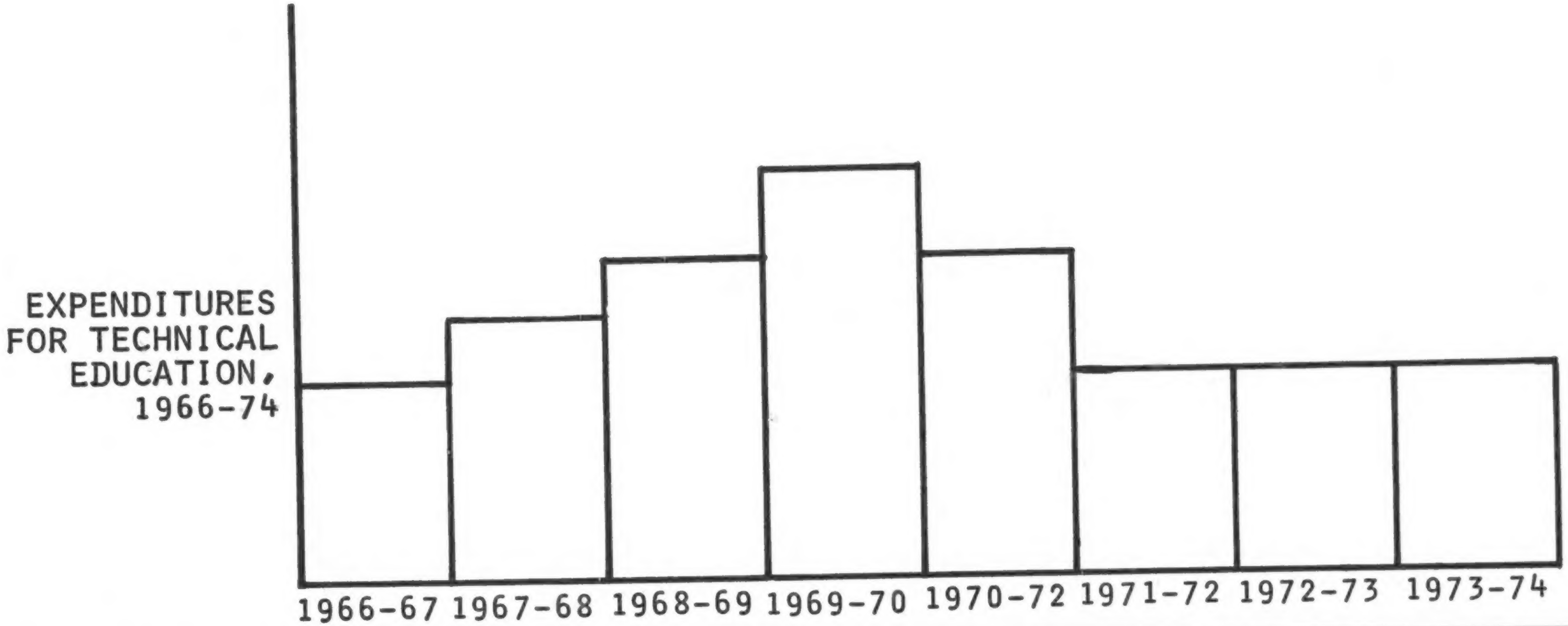
TO ESTIMATE EXPECTED CHANGES IN THE ECONOMIC, SOCIAL AND POLITICAL SYSTEMS.

TO OPTIMIZE THE EDUCATIONAL SYSTEM

TO DESCRIBE FUTURE EDUCATIONAL PROGRAMS

TO DESCRIBE SOURCES OF FUNDS

EXAMPLE



BUDGETING: DESCRIPTIVE STATISTICS ARE VERY IMPORTANT WHILE INFERENTIAL STATISTICS ARE OF LIMITED VALUE.

ROLES: TO ESTIMATE EXPECTED BENEFITS AND COSTS

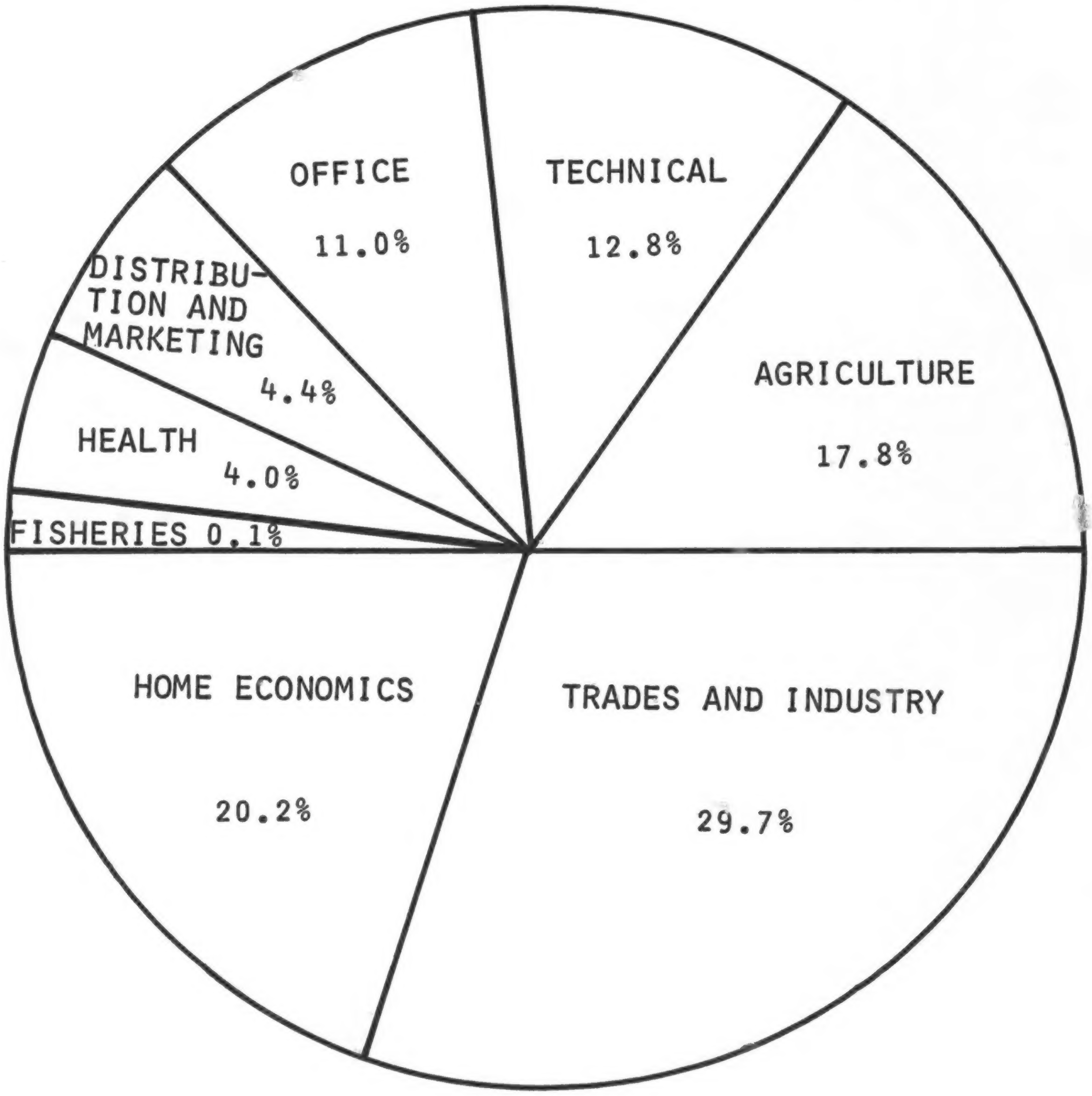
TO DESCRIBE SOURCES OF FUNDS

TO DESCRIBE EDUCATIONAL EXPENDITURES

TO DESCRIBE POPULATIONS SERVED

TO DESCRIBE HISTORICAL TRENDS

COMPARISON OF EXPENDITURES BY PROGRAM, 1965



BASIC ASSUMPTIONS OF STATISTICS

THE PAST IS A GOOD INDICATION OF THE FUTURE. ALL PREDICTIVE STATISTICS ARE DEPENDENT ON THIS FUNDAMENTAL ASSUMPTION. THIS IS ALSO IMPLIED QUITE OFTEN IN THE USE OF DESCRIPTIVE STATISTICS.

DATA ARE ACCURATE.

DATA MEASURE OR REFLECT THE ACTUAL FACTORS TO BE ANALYZED.

TYPE AND FORM OF MODEL PARTIALLY DETERMINES THE CONCLUSIONS WHICH MAY BE DERIVED FROM THE MODEL.

DETERMINANTS OF OPTIMUM STATISTIC MODEL

CHARACTERISTICS OF DATA

- QUANTITY OF DATA AVAILABLE
- QUALITY OF DATA AVAILABLE
- TIME SERIES OR CROSS-SECTION

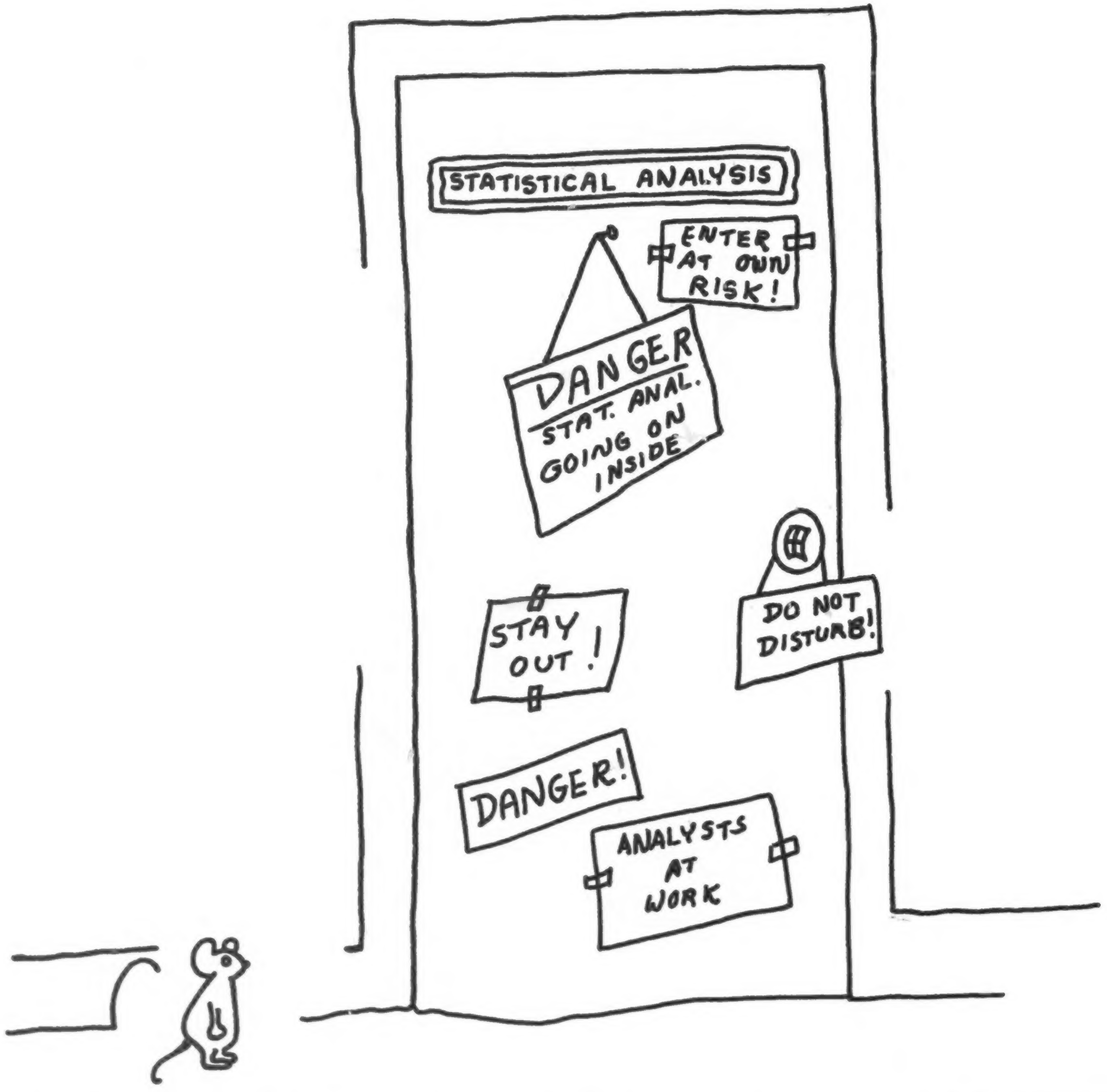
CHARACTERISTICS OF MODEL

- ACCURACY
- COMPLEXITY
- ASSUMPTIONS
- COST OF ANALYSIS

CHARACTERISTICS OF PROBLEM

- IMPORTANCE
- LEAD TIME
- NUMBER OF INDEPENDENT VARIABLES
- COST OF WRONG DECISION
- BENEFITS OF RIGHT DECISION
- OPPORTUNITY TO CHANGE INITIAL DECISION AND COST OF CHANGE
- DEGREE OF UNCERTAINTY

Dangers of Statistical Analysis


STATISTICAL ANALYSIS
ENTER AT OWN RISK!
DANGER
STAT. ANAL. GOING ON INSIDE
STAY OUT!
DO NOT DISTURB!
DANGER!
ANALYSTS AT WORK

DANGERS OF STATISTICAL ANALYSIS

PRIMARY DANGER IS IN THE PROPENSITY OF COMPLEX MODELS TO DAZZLE THE BEHOLDER.

MODELS MAY BE INTERNALLY CONSISTENT AND BE WRONG.

SMALL INDIVIDUAL ERRORS MAY BE COMPOUNDED IN COMPLEX MODELS AND INVALIDATE FINAL RESULTS.

STATISTICAL ANALYSIS MAY REDUCE UNCERTAINTY OF FORESEEABLE EVENTS, BUT DOES NOT CONSIDER UNFORESEEABLE EVENTS.

GENERAL RULE: USE THE SIMPLEST MODEL POSSIBLE FOR GIVEN PROBLEM WHICH YIELDS AN ACCEPTABLE LEVEL OF ACCURACY.

⑤

PART IV

EVALUATING THE TRAINING EFFORTS: PRETEST AND POSTTEST SUGGESTED INSTRUMENTS

COGNITIVE PPBS OBJECTIVE TEST*

AGREE OR DISAGREE (*answer and explain your answer*)

D 1. PPBS tends to decentralize decision making.

D 2. PPBS is capable of providing state policy makers with information so that state policy makers can allocate funds with full knowledge of expected accomplishments.

D 3. Total wages of employed vocational graduates should be counted as benefits.

D 4. PPBS will eliminate the need for subjective opinions in decision making.

D 5. Program categories should coincide with the classification of budget inputs.

D 6. PPBS is basically a method to save money.

---

*The same cognitive test should be used as a pretest and posttest.

D 7. The average level of benefits and costs are more important than the incremental benefits and costs when evaluating program changes under PPBS.

D 8. Program benefits and costs are usually considered separately under PPBS.

D 9. Changes in the level of the interest rate cannot reverse the results of benefit-cost analysis.

D 10. The basic approach and method of PPBS to resource allocation decisions is essentially the same as that of the "Scientific Management School."

D 11. PPBS refers to Politics, Priorities, and Budgeting Systems.

D 12. There are sufficient data existing which indicate clearly which vocational programs are the most valuable.

MULTIPLE CHOICE (*choose the answer most nearly correct*)

1. Educational data *sources* are primarily:

x (a) local.
_____ (b) state.
_____ (c) federal.
_____ (d) local, state, and federal.

2. The most critical aspect of PPBS is to:

_____ (a) establish monetary benefits.
_____ (b) maximize net present value of programs.
x (c) establish specific objectives.
_____ (d) establish monetary costs.

3. A program budget contains:

_____ (a) costs projected over time.
_____ (b) benefits projected over time.
x (c) benefits and costs projected over time
_____ (d) benefits and costs

4. A program structure and financial plan usually covers:

______ (a) one year.
___x___ (b) five years.
______ (c) ten years.
______ (d) twenty years.

5. PPBS is primarily concerned with:

______ (a) obtaining resources.
___x___ (b) allocating resources.
______ (c) finding new resources.
______ (d) accounting for resources.

6. Historically, most governmental budgeting has been concerned with:

______ (a) planning.
______ (b) management (performance).
___x___ (c) control.
______ (d) none of the above.

7. As a system analyst in a state division of vocational education, you should consider only:

______ (a) local benefits and costs.
______ (b) state benefits and costs.
______ (c) local and state benefits and costs.
___x___ (d) local, state, and federal benefits and costs.

8. In analyzing the benefits and costs of a program, one should use the:

______ (a) private rate of interest.
______ (b) public rate of interest.
______ (c) pure rate of interest.
___x___ (d) more than one rate of interest.

9. Cost-Effectiveness Analysis should include only:

______ (a) fixed costs.
______ (b) sunk costs.
___x___ (c) future costs.
______ (d) variable costs.

10. A planner's duties in PPBS require him to:

______ (a) schedule classes.
___x___ (b) consider the construction of facilities.
______ (c) prepare annual budgets.
______ (d) hire teachers and staff.
______ (e) all of the above.
______ (f) none of the above.

COGNITIVE PPBS SUBJECTIVE PRETEST

DATE ______________________ NAME ______________________________

1. What do you expect to gain from this institute?

2. What would you like to receive from this institute?

3. Describe your agency's present PPBS efforts.

4. Do you plan to adopt a PPB System in your jurisdiction? If so, when?

5. What value does PPBS hold for education? Why?

6. What is the primary objective of education? Why?

7. What is the primary benefit of education? Why?

8. What is the primary measurable benefit of education? Why?

COGNITIVE PPBS SUBJECTIVE POSTTEST

DATE ______________________ NAME __________________________________

1. Is your jurisdiction presently operating under PPBS?

2. Do you plan to implement PPBS in your jurisdiction? If so, when?

3. What value does PPBS hold for education? Why?

4. What is the primary objective of education? Why?

5. What is the primary benefit of education? Why?

6. What is the primary measurable benefit of education? Why?

7. What did you gain from this institute?

8. What specific aspects of this institute were the most valuable to your work? In the next year? In the next five years?

9. What specific aspects of this institute were the least valuable to your work? In the next year? In the next five years?

10. If you were to come to another PPBS institute, what specific subjects or topics should be emphasized? Why?

11. What are your suggestions for improving the curricula and instructi instructional method for subsequent institutes or workshops in in PPBS?

12. What might be the benefits and costs of conducting PPBS regional workshops (Federal USOE Regions)?

FREQUENCY OF INTERACTION PRETEST

SECTION 15

INSTRUCTIONS

Listed below are the names of the participants in the Institute. Opposite each name is a range of choices of frequency of communication you would like to have with the person in the next year. For the purposes of this form, please indicate by placing an "X" in the appropriate space, the number of times during the *__next year__* *you would like to communicate with (contact, receive contact from, write, phone, talk to at a conference, etc.) each person whose name is listed.*

NAMES OF PARTICIPANTS	NUMBER OF COMMUNICATIONS IN NEXT YEAR			
	NONE	1-3	4-7	8 OR MORE

FREQUENCY OF INTERACTION POSTTEST

INSTRUCTIONS

Listed below are the names of the participants in this Institute. Opposite each name is a range of choices of frequency of communication you have had with each person. For the purpose of this form, please indicate, by placing an "X" in the appropriate space, the number of times during the last year you have communicated with (contacted, been contacted by, wrote, phoned, talked to at a conference, etc.) each person whose name is listed.

NAMES OF PARTICIPANTS	NUMBER OF COMMUNICATIONS IN LAST YEAR			
	NONE	1-3	4-7	8 OR MORE